THE
LARYNGOSCOPE.

VOL. XIX. ST. LOUIS, MO., JUNE, 1909. No. 6.

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

SOME OBSERVATIONS ON ESOPHAGEAL CASES AND THE PRESENTATION OF TWO NEW INSTRUMENTS.*

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As the title of this paper, "Some Observations on Esophageal Cases and the Presentation of Two New Instruments," indicates, I have attempted neither a wholly connected nor an exhaustive article. I wish to cite briefly certain cases which have taught me a good deal, to discuss somewhat the methods of the examination of the esophagus, to comment on the instruments used for this purpose and to present two new ones. The most frequent esophageal cases are cases of retained foreign bodies and cases of malignant disease. My cases are for the most part of these two kinds. The majority of the foreign bodies were either coins or buttons; the cases of malignant disease were cases of epithelioma. The button and coin cases occurred in children. They led to no fatalities and in some instances were somewhat amusing, at least after they were over. The cases of malignant disease, on the contrary, occurred in adults and were all tragedies.

I shall speak first of the methods of examination, next of malignant disease, then of the button and coin cases and close by the presentation of the new instruments.

The Methods of Examination.

It is very awkward and fatiguing to examine the esophagus with the patient on a table of the usual height. In working upon a new growth at the upper end of the esophagus it is necessary to lower the patient's head so that blood may not be aspirated into the

*Read at the meeting of the Southern Section of the American Laryngological, Rhinological and Otological Society held at Richmond, Va., February 12-13, 1909.

trachea. This forces the operator to his knees and to the floor. All this may be avoided by placing the operating table and the etherizer upon a platform while the examiner stands on the floor. (Fig. 1.) Raising or lowering the head of the table easily brings the mouth of the patient at the most convenient height. The use of the platform gives the examination a more surgical appearance than the kneeling and sprawling method.

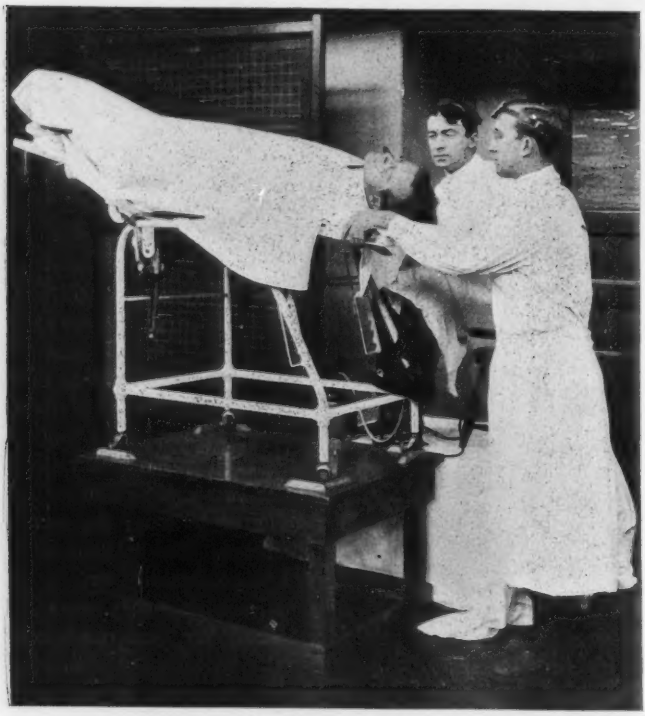


Figure 1.—Photograph to illustrate the platform upon which the operating table is placed for the examination of the esophagus. The examiner stands on the floor.

The ease of the examination of the esophagus depends upon the character of the patient's neck, and the presence or the absence of the teeth, but most of all upon the formation of the lower jaw. The ideal neck for the examination is found in thin, emaciated people with toothless jaws. In addition, the patient's lower jaw should be wide, and should move forward easily. The examination is

frequently troublesome or difficult when the neck is short and fat, when the muscles are very firm, when all the teeth are in place and when the lower jaw is narrow and can be forced forward but slightly. In such cases the introduction of a large tube may be impossible or attended with considerable trauma.

Next to the lower jaw the most trouble in the examination is given by the teeth. First teeth in children, loose or missing teeth in adults, crown and bridge work all worry and hinder the operation. The long, open speculum for the examination of the upper end of the esophagus,unless it is used with care, can loosen or even extract the teeth against which it gets its leverage. In casting about for something to remedy this defect I thought of using the trays which dentists employ for taking impressions of the teeth. These trays

Figure 2.—Impression Tray. This is an ordinary dental impression tray with the handle cut off and the forward part of the tray thinned down.

are made of malleable metal and come in a great variety of sizes. They have the further advantage that they are inexpensive. For our purpose four of these trays are sufficient to fit all mouths. The tray effectively guards the upper teeth. By it gaps in the teeth are bridged over and loose teeth and crowns, and bridge work are protected from the operator, while the operator in turn is protected from ragged and infected stumps. The tray is so thin that it causes but a slight loss of space. When the tube is in place, if the operator prefers, the tray can be taken out. In my work the tray has come to fill a long felt want. (Fig. 2.)

Not only is the absence of one or both sets of teeth a help to the examination, but the absence merely of the lateral teeth also aids very greatly. Fortunately, the molar teeth on one or both sides are frequently wanting. The examiner should always look for the

presence of such a gap and utilize it by letting the esophageal tube rest there.

I prefer, when I can, to examine the esophagus under ether. The rush of the clinic is not conducive to patience, and without a liberal supply of this virtue a satisfactory esophageal examination under cocaine cannot usually be secured. Further, my liking for large tubes which cannot be introduced without ether has led me to prefer examinations under an anesthetic. A negative finding under cocaine is of but little value, whereas a negative finding under ether and with the use of a large tube means something.

The Method of Introducing the Esophageal Tube.

The easiest method of introducing the esophageal tube is to have the head of the patient hanging over the end of the table and to guide the point of the tube into place with the forefinger. With the patient's head but moderately extended so that the cricoid cartilage is movable and so that the front face of the sixth cervical vertebra is not made too prominent, the left forefinger is pushed as far below the arytenoids as possible and an attempt made to push the cricoid cartilage forward. The point of the tube is then carried down into the right pyriform sinus behind the finger and made to follow along its tip to the opening of the esophagus. The procedure is really an intubation of the esophagus. Should there be a sufficient gap in the molar teeth on the right side, when the point of the tube is well engaged the shaft of the tube should be made to lie in it. If this fortunate gap should happen to be on the left side it is better to start the tube in the left pyriform sinus. The finger-tip introduction of the esophageal tube will practically always succeed. Some operators use this method exclusively. I do not for two reasons: first, because I like to examine the upper end of the esophagus before the tube is introduced; second, because I use a larger tube than can be easily introduced by this procedure.

The Comparative Value of Large and Small Tubes.

In examining the esophagus it is important to use as large a tube as the esophagus under examination can be made to take. The esophagus is a much larger structure than we are accustomed to think it is. On this account the tubes commonly employed are too small. In cases where it is possible to introduce only a small tube the examination may be fortunate and satisfactory, but the chances of obtaining a successful examination are so much greater if the large oval tube is introduced that reasonable attempts should always

be made to do so. The end of a small tube readily skims over with secretion in spite of the auxiliary aspirating tube, and the small tube has to be systematically moved from side to side in order to explore the whole of the esophageal wall. A large oval tube, on the other hand, renders the walls more tense and obliterates the longitudinal folds and causes the esophagus to stand open for some inches ahead. A small or medium-sized tube will readily pass over coins and buttons without touching them, while objects like fish-bones or pins are even easier to miss. The large oval tube is the one best fitted, on anatomical grounds, for entering and distending the esophagus. If you once try the experiment of using a small or a medium-sized tube and then replace it by a large oval tube, you will never again use the small tube in cases in which it is possible to introduce the larger one. We all dislike to give a patient a sore throat, but if the purpose of the examination is to detect and to remove a small object like an impacted pin or a fish-bone, to determine the location of an esophageal pouch, or to discover the presence of beginning cancer, large tubes are so much more satisfactory, that I consider the unavoidable trauma, all things considered, a somewhat trival accompaniment. Nevertheless, a method of always introducing the large tubes without having an annoying sore throat afterwards is a thing to be desired and sought for.

The esophagus in the region of the cricoid cartilage is by far the hardest part to examine. It is in examinations in this locality that the open speculum is of the most service. Of course it is harder to pass a large tube by the cricoid than a small one. The difficulty in the introduction of the large tube, however, can in most instances be overcome by placing the head of the patient in the lateral position and by making room for the point of the tube by using the open speculum. So far this procedure has failed me but once. In employing this method as soon as the tube is well engaged behind the cricoid cartilage, the head of the patient should be turned upright and carefully brought over the end of the table. Unless there is disease of the upper part of the esophagus, the tube can now be carried down easily by sight. The lumen of the esophagus, seen through a large tube, appears not as a small black central rosette, opening and shutting with inspiration, but the esophagus stands open for an inch or two beyond the end of the tube, before it narrows down to the customary central rosette. The opening and shutting with inspiration in a great measure disappears.

For over a year I have experimented with the lateral position and the open speculum. This method of examination I have found to be of increasing service for the direct inspection of the pyriform sinuses and of the upper end of the esophagus. It will disclose the presence of tumors in this region, and it permits considerable operative work upon malignant disease situated at or behind the cricoid cartilage. In favorable cases the esophagus can be inspected to within half an inch of the clavicle. I habitually use the lateral position and the open speculum for starting the introduction of the large oval tubes. It is not so valuable for the inspection of the larynx, yet in about one-half of the cases the open speculum used in this position will expose the larynx satisfactorily if pressure is made on the thyroid cartilage from the outside so that the vocal cords are pushed back into the field of vision. The advantage of the open speculum is that it has no hood and so can be carried down into place without obstructing the landmarks which must be passed. When the impression tray is used there is no longer any danger to the teeth. Recently I found the open speculum and the lateral position very satisfactory for the removal of an open safety pin, point up, in the lower pharynx of an infant of seven months. About half the pin was behind the cricoid cartilage. I could see the whole of the pin except where the prong was embedded beneath the mucous membrane. The ability to see so readily made the extraction of the pin easy.

Malignant Disease.

Malignant disease of the esophagus is rarely treated successfully. On this account the subject is a dreary one. The only hope for such cases lies in an early diagnosis. This can now be obtained. Notwithstanding the gloomy outcome of the majority of these cases, we should persist in examining them, because if we do we shall be rewarded now and then by finding a case which is favorable for operation. What I am constantly hoping to come upon is a patient who shows a small growth on the posterior wall of the esophagus back of the cricoid cartilage, or a growth in this vicinity of a low grade of malignancy. In order that such cases may be detected, it is necessary that the medical profession should be impressed with the importance of sending any case of difficulty in swallowing for an early and prompt examination. Hoarseness of any duration in a person of middle life at once arouses the suspicion of cancer; persistent difficulty in swallowing in a person of like age should as promptly raise the question of cancer of the esophagus.

In the examination of malignant disease we are usually satisfied to locate the tumor and to take out a piece for the microscope. Sometimes, in addition, we remove as much of the projecting tumor mass as we can in order to give more room for swallowing. After this we content ourselves with the occasional passing of bougies. I think that we are in a position to go a little farther than this. The examination of the new growth is not complete unless we know not only its location and character, but also the distance which it extends down the esophagus and whether or not there are any other growths below the first one. These are vital points in considering the question of operation. The attempt should be made to gain this information. This is best done in the following manner: First find the tumor, using a large tube, and then remove as many of the projecting masses of the growth as is possible. If the lumen of the stricture permits it, or can be dilated sufficiently, a smaller tube should be passed down the large one and through the stricture into the esophagus beyond. By doing this the vertical extent of the cancer can be determined, as well as the presence or absence of another focus of disease further down. I am fully aware that it is not always possible to carry out this procedure, but it should be the rule to try to do it.

Much help in settling the question of the advisability of operation in these cases can be secured by the routine examination of the neck and chest with the X-ray. By this means how much the neighboring cervical and bronchial glands are infiltrated is readily determed. In two cases of malignant disease I found the right pyriform sinus obliterated at the point where it merges into the esophagus. In one of the cases the right half of the cricoid cartilage was glued to the posterior esophageal wall. This of course may have been a chance happening, but the thought occurred to me as to whether or not the lymphatics of the right side of the esophagus carry the extension of malignant disease more easily than those of the left. This is purely speculative, but there is a practical point to be had in remembering these findings. In cancer cases, whenever the esophageal tube does not readily pass, it is well to leave the middle line in the hope of finding an opening on the right or on the left.

In closing these brief observations upon malignant disease I wish to cite a recent case. It is the only one of the kind which I have seen. The condensed history is as follows: A mulatto 56 years old had noticed difficulty with swallowing for six months. The symp-

toms gave him but little trouble until three weeks before I saw him. At that time he began to cough badly, to have offensive expectoration, and the difficulty in swallowing became extreme. For thirty-six hours he had been unable to swallow even water. The laryngeal examination showed a few wart-like growths on the posterior pharyngeal wall above the larynx, and paralysis of the right vocal cord. Examination under ether disclosed an ulcerated mass in the esophagus back of the cricoid cartilage. The right half of the opening of the esophagus was obliterated. After considerable trying the esophagus was entered by way of the left pyriform sinus, and a bougie was carried easily down to the stomach. The stricture was stretched with the mechanical dilator up to 45 F. The clinical picture was typical of carcinoma and the clinical diagnosis was confirmed by the microscopical findings in the tissue removed.

When the patient recovered from ether I was surprised and disappointed that he did not swallow any better than he did before the dilatation of the stricture. The attempt to pass a stomach tube was not successful. Every effort to take water was followed by violent coughing and strangling, and the expulsion of foul, slightly brownish mucus and sputum. Soft food caused less violent coughing, but it was rejected almost immediately. The examination of the lungs was negative except for a patch of dullness over the right apex, and for fine rales generalized over both lungs. The X-ray showed a large mass between the inner ends of the clavicles and showed also that the right apex was somewhat opaque. The examination of the sputum showed no tubercle bacilli, but gave a few elastic fibers. On account of the intense coughing and strangling whenever the patient attempted to swallow water, and on account of the abundant and foul expectoration and the presence in it of elastic fibres, a probable diagnosis was made of gangrene of the lung following a fistula from the esophagus into the trachea. The patient was fed by enemata. At the end of a week he died suddenly. The autopsy showed a fistula about two inches and a half long and half an inch wide between the esophagus and the trachea. It extended from the lower edge of the larynx nearly to the clavicle. Opposite the lower part of the fistula in the apex of the right lung there was a gangrenous cavity about the size of a hen's egg. This connected freely with the fistula. The esophagus below the fistula was free from malignant disease.

Gangrene of the lung due to a fistula between the trachea and the esophagus is not an uncommon termination of cases of cancer

of the esophagus. I was impressed in this case with the following points: If a patient has cancer of the esophagus, one should suspect the presence of a fistula connecting the esophagus and the trachea

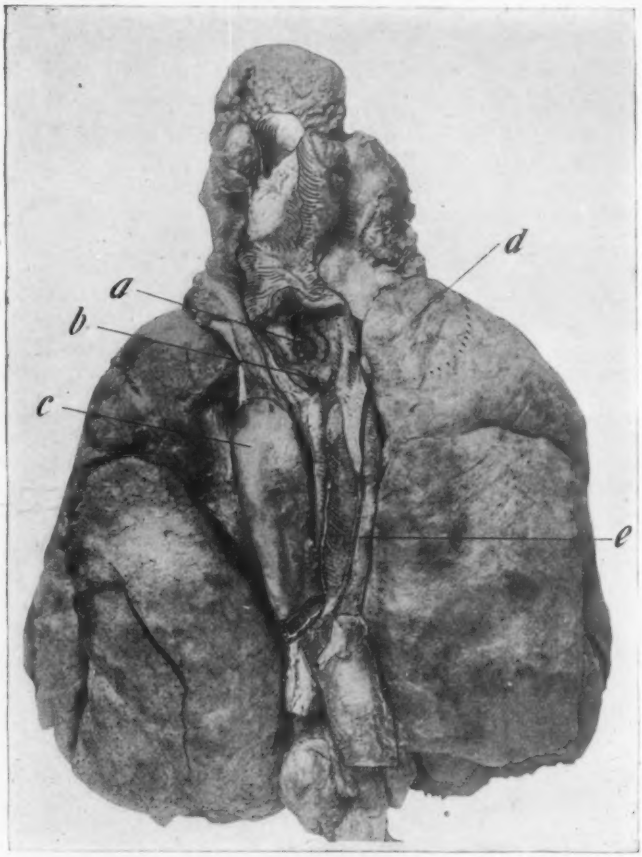


Figure 3.—Autopsy specimen from a case of carcinoma of the esophagus with a fistula into the trachea at the level of the clavicles and gangrene of the apex of the right lung. View from behind.
a. Fistula into trachea.
b. Carcinoma.
c. Descending aorta.
d. Area of gangrenous cavity in apex of lung.
e. Esophagus laid open.

whenever there is abundant and foul sputum and when the swallowing of water causes intense coughing and strangling. Further, the examination of the trachea in this case with a clean tube would

have revealed the fistula, although it was not recognized through the esophageal tube. The anterior wall of the esophagus and the posterior wall of the trachea lie one on the other until the trachea

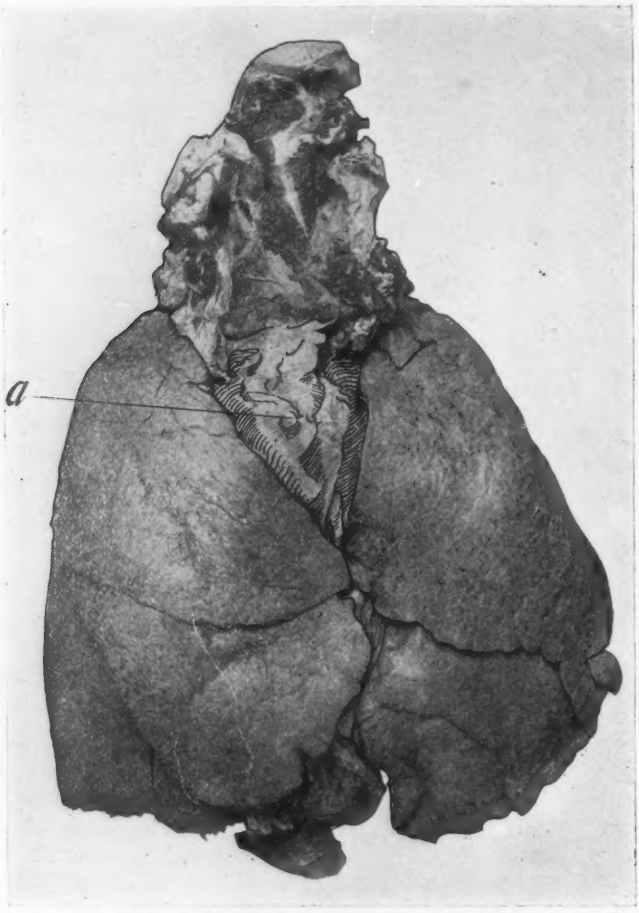
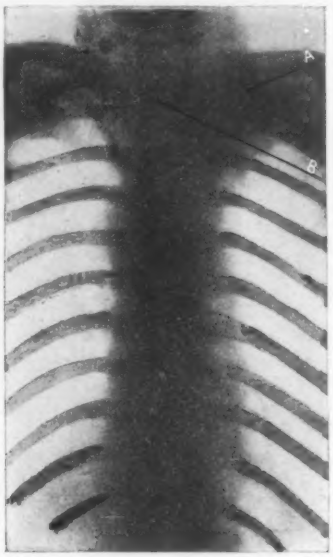


Figure 4.—Autopsy specimen from a case of carcinoma of the esophagus with a fistula into the trachea at the level of the clavicles and gangrene of the apex of the right lung. View from the front.
a. Mass of carcinomatous glands.

bifurcates. Therefore, whenever the examination of the upper end of the esophagus is impossible or unsatisfactory much information can be obtained by examining the posterior wall of the trachea through a tube passed between the vocal cords. (See Figs. 3 and 4.)

Coins and Buttons in the Esophagus.

I have had some humiliating but enlightening experiences with coins and buttons lodged in the esophagus. Two things about such cases have impressed me especially; that it is easy for the examining tube to pass a coin or a button without hitting it and without the examiner discovering it, and that the esophagus is either larger, or, what amounts to the same thing, is more distensible than we have been taught to consider it. My earliest case opened my eyes to the first point. I failed to find a coin which the X-ray showed to be



A Case of Carcinoma of the Esophagus.—X-ray showing a large mass of carcinomatous glands between the inner ends of the clavicles, and opacity of the apex of the right lung due to a gangrenous cavity. (See figures 3 and 4).
a. Gangrenous cavity.
b. Mass of glands.

lying a little below the cricoid cartilage. In this instance a good sized tube was passed fruitlessly all the way to the stomach. The assistant was instructed to have another X-ray taken before the child came out of ether. This second plate showed that the coin was lying undisturbed in its original position. Seeing this the assistant could not resist the temptation to pass the old-fashioned coin catcher. He did so and brought up the coin, and the next morning produced it with a poorly concealed expression of pride.

He apologized, of course, but the case was ended, except for the feeling of humility which has persisted with me in regard to coin cases ever since. I have seen the examining tube pass a coin or button not only at the upper end of the esophagus, but also at the lower end. The ease with which this may happen is another strong argument for employing as large a tube as the esophagus will take. If, however, the esophagus is being searched with a relatively small tube and the coin is not soón located, the following sign is of service

Figure 5.—Photograph to illustrate the position of the esophagoscope for finding coins or buttons lodged behind the cricoid cartilage.

in order to tell when the tube is in the vicinity of the foreign body. Wherever the esophagus is empty it collapses ahead of the tube to a small, dark, central rosette; when, however, the tube approaches the coin, the dark central rosette which represents the lumen of the esophagus disappears and its place is taken by a darker, oval transverse slit. At the place where this occurs the foreign body is lying, the oval slit being due to the fact that the coin at this point

holds the walls of the esophagus apart and at the same time casts a dense shadow.

When searching for a coin which the X-ray shows to be lodged back of the cricoid cartilage, if the coin is not seen readily it is a useful expedient to elevate the handle of the esophagoscope so that

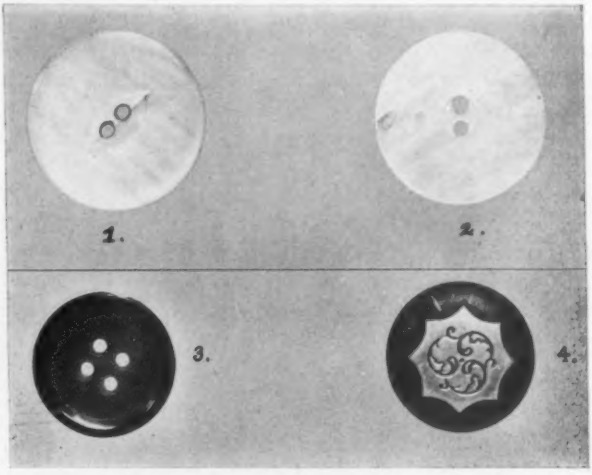


Figure 6.—Photographs of four buttons swallowed and passed by children of various ages.

Button No. 1 is a mother-of-pearl button, one inch and a sixteenth in diameter. This was swallowed and passed in a few days by a child eight years old. It gave no symptoms. A year later this same child swallowed and passed without symptoms a silver fifty-cent piece.

Button No. 2 is a mother-of-pearl button, one inch in diameter and about a sixteenth of an inch thick. This was swallowed by a baby one year old. Examination with the esophagoscope failed to find the button but pushed it into the stomach. The button passed through the pylorus and the remainder of the intestinal canal without symptoms and was discharged within three days.

Button No. 3 is a black bone button which was retained in the esophagus of a boy one year and seven months old, thirteen weeks, and then was discharged.

Button No. 4. This is a metal button. It was swallowed by a girl one year and seven months old. Its course through the intestinal canal is shown by the reproductions of the X-ray plates.

the end of the tube points sharply towards the vertebral column. (Fig. 5.) By adopting this procedure I finally discovered and removed a Chinese coin from the esophagus of the four-year-old daughter of a physician. I have been grateful to this procedure ever since because the tube had repeatedly passed the coin which the X-ray held beside me by another physician, for encouragement, clearly showed to be lodged back of the cricoid cartilage, so that my embarrassment was rapidly becoming extreme.

The Diameter of the Esophagus.

The second point about coin and button cases gathered from my experiences relates to the diameter of the esophagus and to its distensibility. We are always surprised to find how small the larynx is in an infant, and from this we imagine that the esophagus is proportionately small. I am constantly surprised, however, to find how large it is. Some four or five years ago, when I first began to use esophageal tubes, one of the surgeons of our staff asked me to see with him a year old baby who had swallowed a flat, mother-of-pearl button. (Fig. No. 6.) The happenings before I saw the child were rather typical. Perhaps you will say that those which followed were. On reaching the child the surgeon passed his finger into the throat and felt the button. Then he attempted to grasp and remove it with the old-fashioned curved, esophageal forceps, but the manoeuvre failed. At this juncture I was asked to see the case. A satisfactory X-ray had not been obtained, so the position of the button was not known. Before the ether was started for my examination the surgeon said that he would like to pass a soft

Figure 7.—Button No. 5. This is a side view of the button figured as Button No. 4.

rubber catheter in order, if posssible, to locate the button. He did this, and the catheter went down easily without striking anything. The child was then etherized and I had my try, but found nothing. The button was passed by rectum in the next twenty-four hours. Between us this button was forced into the child's stomach. I have yet hardly gotten over my surprise that a button of this size (the button is round, and its diamater is just one inch) could pass the esophagus of a year-old child, to say nothing of passing through the pylorus.

This button shows not only the distensibility of the esophagus of one year, but it shows also that if a button or coin cannot be grasped and removed by means of the esophageal tube, it is good practice, at least from the standpoint of the patient, to push the button down either intentionally or unintentionally. Surely it is not necessary to resort to an immediate opening of the esophagus from the side of the neck. Such operations are now rare in our hospital. They should become rare in every other institution.

I must pay my respects to the bristle probang, and this seems as good a place as any to do it. The only time when the use of this instrument is permissible is in cases where a bolus of meat or a smooth foreign body like a coin or a button is lodged back of the cricoid cartilage. Its use is often successful in such cases and is with-

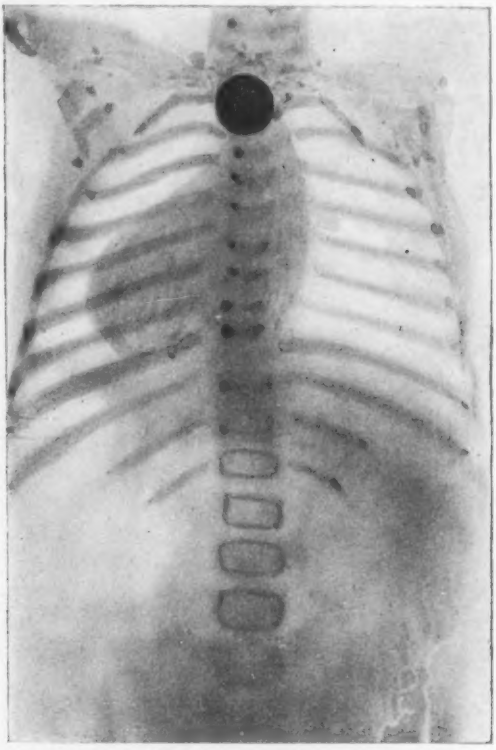


Figure 8.—(Figures 8 to 11 are reproductions of X-ray plates (retouched) showing the time taken by a metal button seven-eighths of an inch in diameter to pass through the intestinal canal of a child one year and seven months old). The first plate shows the button at the level of the clavicles. The button lodged here three days.

out danger. On the other hand, its use is contra-indicated when rough foreign bodies like fish-bones or meat bones are to be dealt with. Even in coin cases the use of the probang should not be persisted in, because, unless the first trial is successful, the foreign body is released from the grasp of the cricoid cartilage and sinks to the level of the clavicle. For a similar reason the use of the finger

should not be persisted in unless there are urgent symptoms of suffocation. In such cases, of course, the finger must soon give place to the knife. At the cricoid it should be an easy thing to remove a coin with the open speculum. Care should be taken therefore not to send the coin down.

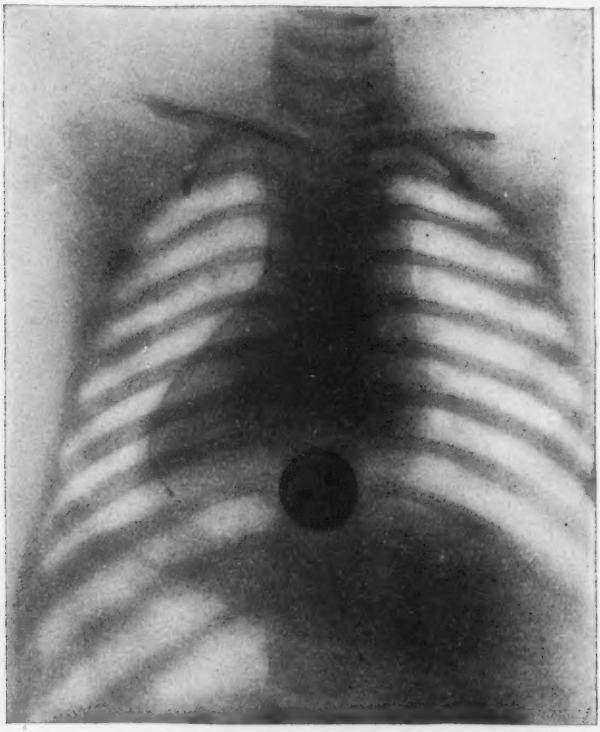


Figure 9.—The second plate shows the button at the cardiac opening of the esophagus. The button halted at this point after it was loosened by the examining tube.

The Places in the Esophagus Where Foreign Bodies Usually Lodge.

The opening of the esophagus is made by the cricoid cartilage in front and vertebral column behind. Thus the opening is really a transverse bony slit. A coin, therefore, enters the esophagus flat, the same as a coin must enter the automatic telephone. This was the first of the many things which I have learned about the esophagus from Dr. Ingals. Since the long diameter of the esophagus is transverse the coin maintains its original position, that is it lies

flat against the vertebral column all the way down. Coins and buttons lodge first back of the cricoid cartilage, and second just above or below the clavicles. It is very evident why they stick back of the cricoid, but a sufficient reason is not found so easily for their lodging in the second place. It is possible that the thymus or the inward mounding of the arch of the aorta may help out the natural constriction which occurs at this point. Once by the clavicles, coins seldom stop at the cardiac orifice of the esophagus.

But to return to button cases. A child a year and seven months old was brought to the hospital some twelve months ago with the history that he had swallowed a button. He could take milk, but rejected any more solid food, and in addition he had a persint cough. The button was not found, and it was not passed in the few days while the child was kept in the hospital under observation. A year after any patient leaves the Massachusetts General Hospital a letter is sent asking that the patient return in order that we may learn what we have or have not accomplished for him. In response to such a letter the child was brought back. With the child the mother brought this black bone button, and said that it was passed thirteen weeks after it had been swallowed. The significant facts about this case are these: All through the thirteen weeks the child had an annoying cough and all the time the child took milk readily but regurgitated more solid food. A few days before this boy was brought back to us to report, we had another child, a girl of exactly the same age, who had swallowed this metal button. This second child had a cough like the first one, also she could swallow milk but regurgitated everything else. The X-ray showed that the button was lying a bit below the level of the clavicles. The button was not extracted. The reason for this I will give presently. What I wish to emphasize now is that as long as the button was in the esophagus only milk could be swallowed. The conclusion seems to be justified then, that in any case where the signs just mentioned are present, or in any case where an examination results negatively, and yet such symptoms persist, there is still a foreign body in the esophagus. (Figs. 6 and 7.)

I wish to mention another thing about this metal button. The X-ray located it at the level of the clavicles, and it was at once seen through the tube. In attempting to grasp it, however, the button was nibbled, not seized. The force used was sufficient to loosen it and the esophagus immediately seized it and carried it down ahead of the pursuing tube. The lesson to be learned from

this is that it is important to adjust the forceps beforehand so that the blades will open widely enough to take in the button. If possible, therefore, have the parents bring you a mate of the button which has been swallowed. Very often they bring a second button of their own accord. On this the grasp of the forceps can be tested.

The whole course of this button was charted by the X-ray. (Figs. 8, 9, 10, 11.) After the button was dislodged by the examining tube it was seen to disappear ahead of the tube and then was lost. Accordingly, the child was sent to have another plate taken before she came out of ether. The second X-ray showed that the

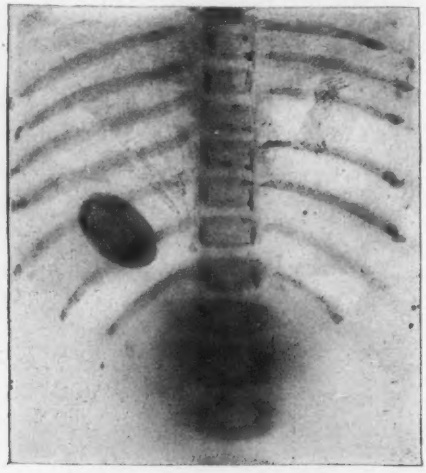


Figure 10.—The third plate shows the button in the empty stomach. It entered the stomach at some time in the twenty-four hours after it lodged at the cardiac opening of the esophagus.

button had halted at the cardiac opening of the stomach. Dr. Dodd, our Roentgenologist, never saw this happen before. Once by the clavicles, a button seldom finds any difficulty in entering the stomach. I have here reproductions of the plates. They are of interest because they show how fast a button of this size passes through the intestinal canal. The child swallowed the button three days before she was brought to the hospital; presumably, therefore, the button lay behind the clavicles three days. Then it was dislodged and traveled to the cardiac opening. In twenty-four hours it was in the stomach, which at this time was empty except for the button,

and in forty-eight hours it had passed the pylorus and was a little below the brim of the pelvis. Here it halted again three days and then was discharged. Judging from the course of this button, coins and buttons lodge the longest in the upper and the lower parts of the intestinal canal. The pylorus is passed easily and quickly. The places in the intestinal canal where buttons remain the longest time

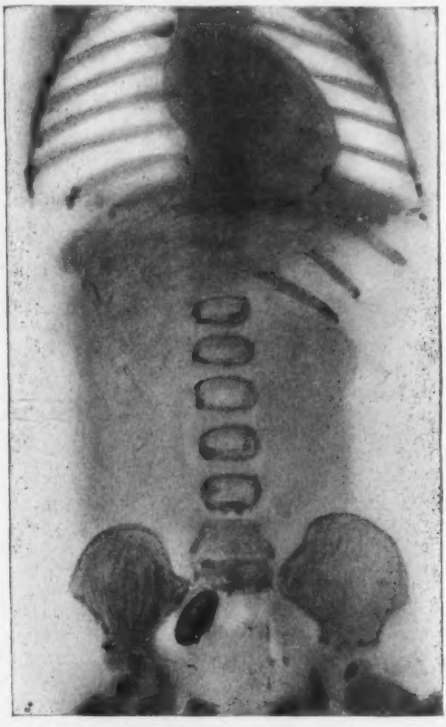


Figure 11.—The fourth plate shows the button at the brim of the pelvis. The button passed through the pylorus and reached this point in forty-eight hours. Three days later the button was discharged.

of all are back of the cricoid cartilage and in the region of the clavicles.

In taking X-ray plates of coins and buttons, much better results, Dr. Dodd tells me, are obtained if the patient lies on his face on the plate instead of on his back.

One more observation and I have finished with foreign bodies. If during the examination for a fish-bone or for a coin the patient

happens to vomit, at once look over what has been expelled, because the foreign body may be in the vomitus. I have knowledge of one such case. The patient had swallowed a fish-bone. He took ether poorly and early in the examination vomited. The introduction of the tube was difficult and somewhat delayed because the man had a short, fat neck and a narrow, immovable lower jaw. The tube was finally introduced and a wound found in the esophageal wall, but the fish-bone was not seen on searching carefully as far as the stomach. Then the vomitus, which all this time had

Figure 12.—Safety Pin Closer. Upper figure, the safety pin closer with the receiving ring flat for introduction through the tube. Lower figure, the ring turned upward to a right angle and the safety pin closed by the ring.

been lying on the floor, was examined and the fish-bone found in it. This was dramatic, but not strictly according to program.

Instruments.

Some of the instruments which I have with me have been described before. These I shall say little about, contenting myself with presenting them for your inspection in case you have not all seen them.

The Safety Pin Closer. (Fig. 12.)

The original of this safety pin closer was gotten out by me some four years ago, and it has since demonstrated its usefulness. A

Figure 13.—Safety Pin Catcher. Rigid safety pin catcher for the lower pharynx and the upper esophagus. Upper figure, full-length side view. Lower figure, the method of grasping and closing a safety pin.

little over a year ago Dr. Jackson and I modified it at the same time and in the same way. The modification consisted in changing the receiving ring, which was at first stationary, so that it became movable. The ring can now be introduced flat and then turned up at a right angle. The modified instrument is much more efficient than the first one. Here is a second and a simpler safety pin closer.

As you see, it is a rigid instrument. It was designed for use in the lower pharynx and about the opening of the esophagus, and it is best employed in connection with the open speculum. (Fig. 13.)

The Open Speculum for Examining the Upper End of the Esophagus. (Fig. 14.)

Earlier in this article I have spoken of the open speculum. It is of use for making a diagnosis of tumors back of the cricoid cartilage, for removing projecting masses of cancer for the palliation of symptoms, for extracting foreign bodies lodged back of the larynx, and for starting the introduction of the large oval esophagoscope. I never use it now without protecting the teeth by the impression tray.

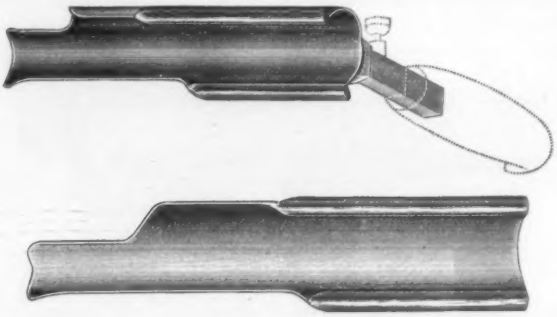


Figure 14.—Open Speculum for the Upper End of the Esophagus. Upper figure, speculum, three-quarters view. Lower figure, speculum, full side view.

A Mechanical Dilator for Strictures of the Esophagus.

This dilator for strictures of the esophagus is built on the same principle as the Kollman dilator used for strictures of the urethra. By changing the central rod the shaft of the instrument can be made rigid or flexible. The instrument has two tips, one which is small and blunt and perforated for the passage of a thread, and one which carries a small elastic bougie. With this instrument the treatment of strictures of the esophagus can be conducted in much the same manner as the treatment of strictures of the urethra. (Fig. 15.)

The following case illustrates its possibilities. A two-year-old boy was kindly referred to me by Dr. F. C. Cobb. Three months previously the child drank a solution of potash. After the inflammatory effects of the caustic subsided, the boy gradually de-

veloped increasing difficulty in swallowing. When I saw him he was taking only milk. One day this would stay down and the next it would be returned a few minutes after it was swallowed. A number 16 bougie (F) would not enter the stomach. Under ether a stricture was easily seen through the tube at the cardiac end of the esophagus. It was fairly resistant but was dilated readily with bougies to 20 (F). The examination showed that the stricture was about one inch long. After this amount of dilatation of the stricture, milk was retained but more solid food rejected. At this time I did not have the mechanical dilator. A week later, when it was finished, the boy was etherized for the second time and the stricture again dilated up to 20 (F), the size of the mechanical dilator. With the lumen of the stricture centered at the end of the tube it was easy to pass the dilator down the tube and through the stricture. This done, the dilator was cautiously opened to 32 (F). The resistance

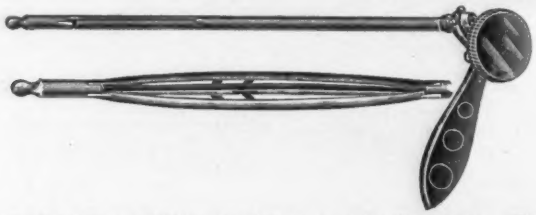


Figure 15.—Mechanical Dilator for Strictures of the Esophagus. The upper figure is a full-length side view of the dilator. The lower figure represents the dilating mechanism open.

offered to the dilatation became extreme at this point and the stretching was accordingly stopped. After this second dilatation all food was swallowed without difficulty, and it was possible to pass a 32 (F) bougie without ether. Since this time the family physician has passed the same sized bougie once a week. In this case the mechanical dilator accomplished what it would have taken weeks, perhaps months to accomplish by the old method. To me this seems the ideal way to treat most strictures of the esophagus. It has the advantage of being extremely direct. The stricture is first located by the tube and centered at its end, then the stricture is dilated to the size of the mechanical dilator, using for this purpose soft bougies, and the dilator passed by sight through the stricture. In this method there is no danger of pushing through the pouch which so soon develops above a stricture. Further, no force is exerted in a downward direction, as must always be the case when a tightly fitting bougie is forced through a stricture. Force is exerted only in the direction in which it is needed, that is, outward.

The Window Plug for Rendering the Examining Tube Air-Tight and Ballooning the Esophagus. (Fig. 16.)

About a year ago, after experimental work upon the cadaver, I published a short account of this contrivance for ballooning the esophagus. It was only a week before this article was written, however, that a case exactly fitted for it came to hand. This case is so recent and was so successful that you must pardon me if I am a little enthusiastic about it and perhaps not entirely judicial. The idea of the contrivance is very simple. The large oval tube is fitted with a detachable metal plug, the plug having a glass window at the outer end. When this plug is in place the tube becomes air-tight. This accomplished, the rubber bulb which is used for sucking secretion from the esophagus by means of the auxiliary tube is attached to the receiving bottle reversed. By this manoeuvre air

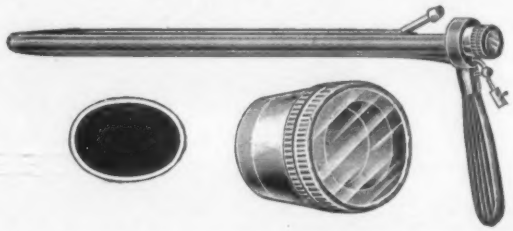


Figure 16.—The Window Plug for the Esophagoscope. Upper figure, the esophagoscope made air-tight by the window plug. Lower figure, the window plug, exact size, and a cross section of the esophagoscope, actual size.

can be forced down the auxiliary tube into the esophagus and its walls can be distended. If sufficient force is exerted, the plug may even be blown out. In using this procedure it is well, therefore, to watch the stomach through the abdominal walls in order to see that it does not become over distended. The case which illustrates so prettily the advantages of this instrument is as follows: A woman of middle age was sent to me with a history suggesting a small esophageal pouch. Some years ago she had a gastric ulcer, and recently it had become necessary to wash out the stomach for the treatment of a fermentative disorder. The immediate symptom which caused her physician to refer her to me was the fact that the last attempt to pass the stomach tube was unsuccessful. The patient had a narrow under jaw, so that the introduction of the larger oval tube was difficult and somewhat delayed. The tube was finally passed, but it halted a little below the cricoid cartilage. At this

point no opening could be found ahead of the tube. The large tube was taken out and a smaller one passed by means of the Jackson tube spatula. The smaller tube went down readily to the stomach and the esophagus appeared to be normal. Not satisfied with the finding of the smaller tube, I went back to the large oval one. Again it halted about an inch and a half below the cricoid in what appeared to be a blind pouch. Then I stopped the end of the oval tube with the transparent plug and had the assistant force air into the esophagus. The blind cavity in which the tube was resting at once dilated and was seen to be a pouch. The examining tube was now slowly withdrawn. With every pressure upon the bulb the pouch expanded and its walls stood out clearly. Finally, when the end of the tube had been withdrawn until it was about an inch below the cricoid cartilage, suddenly two openings were seen. Both expanded with every pressure upon the bulb. The examining tube could be passed into either opening at will. On removing the transparent plug, a long metal probe passed into the lower left-hand opening went into the pouch. This proved to be about an inch long. A bougie passed into the upper right-hand opening descended to the stomach with the greatest ease. What I had hoped for a year ago from this apparatus had come true.

Never before have I been able to obtain information of this kind in the case of an esophageal pouch. Since this case, in the examination of a patient who proved to have a normal esophagus, this procedure of ballooning was of great help in picking out the lumen and showing the direction in which the tube was to proceed. The ballooning was of the most service just back of the cricoid cartilage the point where it is the hardest to make the large tube pass easily. Below this place the ballooning was not necessary, because it was then accomplished sufficiently by the end of the tube.

The pouch case taught me another thing. I knew that a pouch usually came off the esophagus somewhere back of the larynx, generally near the cricoid. I had always pictured to myself that it started from the esophageal wall by a small opening and that the sack of the pouch gradually enlarged until it lay in the tissues of the neck like a long, thin flask, mouth up. In the case which I have just described the formation of the pouch was not anything like this. The opening of the pouch and the opening of the esophagus both were about an inch below the cricoid and on the same level. From the formation which was present it seemed as if the pharynx had extended an inch below the cricoid cartilage and there had

attempted to make a double esophagus. It should be remembered in connection with this case that the opening of the pouch was missed by the small tube and the opening of the esophagus by the large one. It was easy to pass the large tube into either when their openings were found, but both openings were not found until the esophagus was ballooned with air. Therefore I think that the large tube with the attachment for ballooning has a useful future ahead of it.

The Coin and Button Tube. (Fig. 17.)

The coin and button tube is a modification of the ordinary Jackson tube. As coin and button cases occur most frequently in infants and in children up to three or four years of age, the calibre of the tube is suited to the esophagus of one year. Coins and buttons almost always lie flat and parallel with the vertebral column. On

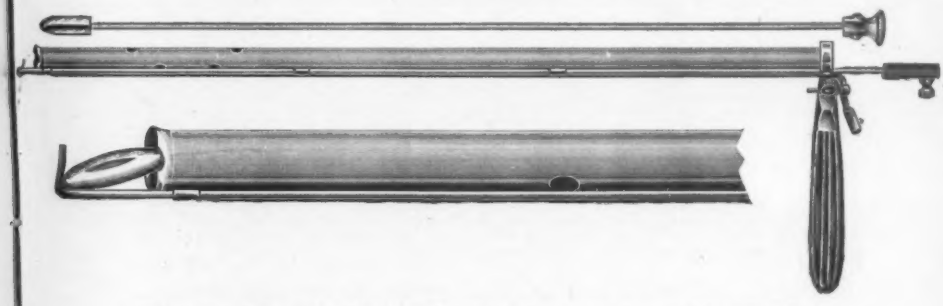


Figure 17.—Coin and Button Tube. The upper figure is a full-length side view of the tube with the hook pushed down a little beyond the tube. The lower figure shows the method of grasping a button with the tube.

this account the exploring tube either passes over or under the coin or encounters it edge on. The aim of the operator is to find the coin edge on, so that the forceps can grasp it. When the coin is found, its upper edge corresponds to the central horizontal diameter of the tube. Above and below the rim of the coin there is a clear space. In these two clear spaces the blades of the extracting forceps are inserted. Owing to the relatively small tube which must be used in a child, the actual seizing of the coin often has to be done somewhat blindly because the blades of the forceps and the barrel nearly fill up the lumen of the tube. It occurred to me that if the forceps could be attached to the outside of the tube, better vision might be obtained. By referring to this tube or to the diagram of it, you

can see how this has been managed. At the side of the auxiliary, light-carrying tube, in the groove between it and the main tube, a small steel wire is passed. This ends in a hook, which is bent backward slightly and bent on the flat so it fits snugly about the end of the main tube, taking the place of a part of the flange. The hook can be pushed ahead of the main tube about two inches. The end of the main tube has two notches, one at either extremity of its median, horizontal diameter. The shaft of the hook projects through the rim of the main tube. It has a handle which can be set so as to show the direction in which the hook is turned, and there is also a thumb-screw, so that when the hook is once in the desired position, it can be retained there.

The coin tube is used as follows: The coin is first found, end on, and its rim made to correspond with the notches in the end of the

Figure 18.—Triangular Fenestrated Tube. Upper figure, full-length side view, showing the window at the end of the tube. Lower figure, the sharp plunger which acts as a guillotine.

main tube. When this has been accomplished the hook is pushed below and beyond the coin. The hook is then turned so that the point is up, and then it is pulled backward towards the operator until it pushes the coin firmly into the retaining notches of the main tube. Then the handle of the hook is made fast by setting the screw in the rim of the main tube, and the coin and the tube are drawn out together.

The advantages of the tube are the clear view which it gives and the rigidity of the hook. Since the hook projects beyond the end of the main tube only two inches, it does not have the play of the long canula which makes the shaft of the usual instrument which is designed to be introduced through the whole length of the examining tube. With the hook there is no need of touching the coin from above, with the danger of dislodging it and allowing the esophagus to carry it away from the operator. The hook can be used for any purpose for which a hook is adapted. It would seem

to be especially suited to act as a stop beyond a foreign body. Further, it could be passed beyond a foreign body like a dental plate, so that the plate could be grasped and turned into a favorable position for extraction. The same thing might be done with a piece of bone or a piece of irregular metal. The use of the hook as a stop does not bar out the use of the customary forceps through the main tube. In this way appropriate foreign bodies can be approached at the same time, both from above and from below.

In the making of instruments it is not easy to come to an end. I have another modification of a tube which I wish to show. (Fig. 18.) The tube is not for the esophagus. I have shown perhaps enough of these. This tube is for the larynx. It is a modification of a French window tube, and is designed for papilloma of the larynx. The tube is made triangular in order to fit snugly into the anterior commissure of the cords. It is used, like other fenestrated tubes, by inserting it into the larynx until the growth projects into the tube through the windows at the sides and front. When the growth projects into the window of the tube it is cut off by pushing down a plunger which is made sharp so that it acts as a guillotine. The tube is partially closed at the bottom so that it catches the pieces which are cut off. The end of the tube is conical so that the tube is its own obturator. The larger tube made for an adult will pass through the Jackson tube spatula. There is a smaller size for children. The tube must ordinarily be used with ether. It is designed, as I have said, for growths in the anterior commissure or for those cases in which under either cocaine or ether it is very hard, if not impossible, to get a sufficient view of the larynx for accurate operating.

No. 828 Beacon Street.

Contribution to the Illumination of the Connection Between Nose and Eye Diseases. PROFR. SCHMIEGELOW. *Hospitalstidende*, 1906, p. 1187.

After a brief resume of the rich literature of the subject, Schmiegelow mentions two cases with retrobulbar neuritis optica, due to a latent suppuration in its sphenoid and ethmoid cells, which healed after opening and douching of the accessory sinuses.

KIAER.

CHRONIC STENOSIS OF THE LARYNX CURED BY DILATATION.*

BY D. BRYSON DELAVAN, M. D., NEW YORK.

M. C., aged 35, unmarried, residing in New York, of excellent family history and of general good health, began to suffer from laryngitis in June, 1901. No history of any constitutional disease has ever been obtainable. She was treated by her family physician without relief, and in December was seen by one of the attendants at the Vanderbilt Clinic.

In January, 1902, I saw her in consultation and found a severe general laryngitis with marked erosions upon the free borders of both vocal bands extending from the anterior commissure backwards for a little less than one-half the length of the vocal bands. I advised a certain line of local treatment for the larynx and insisted that unless an O'Dwyer tube of sufficient size was inserted into the larynx and worn for a considerable length of time, the erosions upon the vocal bands would result in cicatricial union of the bands with dangerous obstruction. I did not see the patient again for more than a year.

Meanwhile, a feeble attempt had been made to insert an infant-size tube into the larynx, but the tube could not properly be retained and was too small to accomplish any good result.

I am informed that the larynx gradually closed until, in January, 1903, urgent dyspnoea supervened, and the patient was hurried to the New York Hospital, where a rapid tracheotomy was done.

In the performance of this the incision into the trachea was not made directly in the median line, a circumstance which gave rise to much trouble later whenever it became necessary to reinsert the tube after removal for cleansing, and which on one or two occasions nearly cost the patient her life.

Subsequent to the tracheotomy the patient placed herself in my hands. The wearing of the tube was irksome to her, and her general health suffered somewhat seriously in consequence of it. She had constant bronchitis and at one time appeared to be going into a decline. The lumen of the larynx meanwhile remained so contracted that respiration without the tube was impossible. The voice, however, was fairly good. The tracheal cannula was worn for

*Presented before the Section on Laryngology and Rhinology of the New York Academy of Medicine, March 24, 1909.

about two years. At the end of this time the contraction of the interior of the larynx seemed to have reached a maximum.

Meanwhile the patient had become very desirous of being relieved from the incessant annoyance of the cannula. In consultation with Dr. John Rogers, Jr., it was determined to attempt to permanently relieve her, and the case was placed in his hands.

The method of dilatation by means of the O'Dwyer tube was adopted by Dr. Rogers, and the first intubation was made in March, 1905. On this occasion the tube was retained for five weeks. It was then taken out, but a re-contraction occurred within a week to such an extent that its re-introduction was demanded. Following this the tube was worn for varying lengths of time, but its extraction was always quickly followed by dyspnoea requiring re-introduction.

At the end of more than a year of this line of treatment and after an unusually long period of continuous wearing of the tube, the appearances of the larynx were so favorable as to make it hopeful that re-contraction would not occur. Within five weeks of the removal of the tube, the dyspnoea returned. At this time the cicatrices and thickening seemed to have been aggravated and to have become if anything worse than ever. Not only were the vocal bands adherent anteriorly, but below them was a dense thickening which extended downward upon the anterior wall of the subglottic space. There was much thickening also at the posterior commissure.

It was decided to make an incision in the anterior obstruction throughout its full depth and to insert an O'Dwyer tube which should be retained continuously until healing of the incision had been completed. In carrying out this operation the admirable cutting dilator of Dr. J. W. Gleitsmann of New York was used, and we found it both theoretically and practically by far the most convenient, accurate and effective instrument of its kind. By its aid division of the obstructed tissue was easily accomplished and with but little pain. An O'Dwyer tube of maximum size was then inserted into the larynx and worn from the date of the operation, June, 1906, until the following September, when it was removed and left out until January, 1907. At this time, however, there seemed to be much swelling in the larynx, both anteriorly and at the posterior commissure. The swelling seemed to be an infiltration of the tissues due to irritation.

In January, 1907, there was a sudden return of urgent dyspnoea under somewhat startling conditions. A large O'Dwyer tube was

re-inserted and was worn continuously for more than eight months, namely, until September, 1907, when it was taken out. A small amount of swelling still remained, both in the anterior and posterior part of the larynx, but the patient was kept under careful observation, and this, instead of increasing, seemed to subside. As time passed, the laryngeal space visibly increased until but slight trace of the above-mentioned thickenings remained.

Since September, 1907, a period of over eighteen months, the patient has had no trouble whatever with breathing. Her general health has improved in every respect. She has been able to resume the normal affairs of life with complete comfort and success.

While this result has been gained at the sacrifice of what remained to her of her voice, she is nevertheless able to communicate without difficulty, and in all other respects the cure of the laryngeal condition has been attended with nothing but advantage.

The result must be considered a brilliant one when the discomforts and disabilities of the lifelong wearing of a tracheal cannula are remembered. From the simple relation of the case, as well as from the present appearance of the larynx, it is plain that nothing short of extraordinary skill and untiring patience on the part of Dr. Rogers could have brought it to a successful issue. Nor does it seem in the light of our present knowledge that any better method of treatment could have been employed.

No. 1 East Thirty-third Street.

Further Experiences in the Treatment of Nasal Deformities by Paraffin Injection. TETENS HALD. *Hospitalstidende*, 1906, p. 845.

Hald treated forty-seven patients with very fine results, though many of these had complete saddle-nose or spyglass-nose. He has always used paraffin with a melting point above 50° C., and injected it in solid form, and has never had the well-known disagreeable complications such as embolism, thrombosis, or tropic disturbances. He has found in the literature twelve cases with disturbance of sight after injection of paraffin, and in the ten in which the melting point was mentioned it appeared that this was 43° C. or lower; but there was no mention of disturbance of vision where the melting point of the paraffin was over 50° C. KIAER.

SHEET OF DIRECTIONS GIVEN THE PATIENT AFTER A TONSIL OPERATION, INCLUDING THE TREATMENT OF POST-OPERATIVE HEMORRHAGE.*

BY EDWIN PYNCHON, M. D., CHICAGO.

Having recently read a paper on the "Treatment of Post-Operative Nasal Hemorrhage" at a meeting of the South Branch of the Chicago Medical Society, which was well received, and having just revised my "Sheet of Directions to Patients After a Tonsil Operation," I take the privilege of presenting the same, chiefly owing to the consideration given therein to the treatment of post-operative hemorrhage.

Any persistent or profuse hemorrhage following a tonsil operation is an annoyance to both the operator and patient and may, if not promptly and properly treated, even prove dangerous. The old adage which deals with the truism that "a stitch in time saves nine" applies nowhere more appropriately than in the treatment of tonsillar hemorrhage, for, while in most cases it can be quickly controlled by prompt and efficient treatment, it may otherwise continue, or intermittingly recur, much to the patient's discomfort.

A hemorrhage from the throat or nose generally unnerves the patient more than would the loss of an equivalent amount of blood from some other location. Furthermore, owing to free salivation, nausea and even vomiting often thereby induced, the amount of blood lost seems to be greater than it really is.

In order to meet emergencies arising in practice I have for several years followed the custom of giving the patient from time to time printed sheets of instructions to insure the following of directions, and to provide for complications which may occur. In no place is such a sheet of directions of more value than after a tonsil operation as a guide to both diet and treatment, and particularly in order to meet the possible occurrence of post-operative hemorrhage at any time within about eight days following the operation. I herewith append a copy of this particular sheet of directions:

DIRECTIONS TO THE PATIENT AFTER A TONSIL OPERATION.

For the first two or three days avoid all violent exercise or sudden motion. In going up stairs the ascent should be made slowly. Use the voice in moderation and do not attempt to sing or to

*Read at the meeting of the Chicago Laryngological and Otological Society, March 9, 1909.

speak too loud. In order to *avoid stooping* the use of the sniffing medicine may be omitted for the first 24 hours after the operation.

During the first night after the operation the patient should sleep with the head well elevated by using several pillows or else by putting an inverted chair under the bolster and pillows, the legs of the chair being against the head of the bed, with the back of the chair sloping on a downward incline towards the middle of the bed. A still better way is to rest for the first night in a *reclining chair*. A large rocking chair, tilted well back, and held in this position by placing a small box or even a bureau drawer under the forward end of the rockers, will also serve admirably. If possible so to do, it is better to avoid sleep for the first night and pass the time by reading an entertaining story.

Use the soda gargle every fifteen (15) minutes while awake. It is made by adding a teaspoonful of *Merck's* bicarbonate of soda to a glass of water, or what is still better, and more agreeable, add the teaspoonful of soda to a 25 percent solution of some one of the pleasant vegetable antiseptics, as thymoline or oleoseptine, which means one-fourth (1-4) glass of the antiseptic selected and three-fourths (3-4) glass of water. In place of the soda gargle some have preferred a weak solution of green castile soap. Sozodont well diluted might also be suggested.

As the wound is deep after any operation whereby the tonsil is thoroughly removed, and as such deep wound is often not well cleansed by gargling, there is advised additionally the hourly use of a suitable syringe whereby the wound may be well cleansed with the same solution (the soda gargle). The best form of syringe to employ is a hard-rubber 1-2 ounce post-nasal syringe, the several openings of which insure efficiency. By having a mirror in a window, or by a gas jet, the wound can be easily seen, particularly if the tongue is held down with the handle of a tablespoon so the patient can direct the stream with sufficient force into the wound. In addition to the hourly use of the syringe, the gargle should be used between times every 15 minutes as directed for the first day or two, and less frequently thereafter during the remainder of the first week.

If the iron medicine is prescribed, it should be taken as directed immediately after having used the soda gargle. The dose is one-half (1-2) teaspoonful to be introduced in the back part of the mouth, avoiding the teeth, and swallowed slowly. Immediately thereafter rinse the forward part of the mouth and the teeth with the soda gargle. Repeat the dose every two hours for two or three

days, say at 2, 4, 6, 8, 10 and 12 o'clock. After this use less frequently, say every three or four hours as directed. *Caution.*—The iron medicine is not to be taken until the day following the operation.

Should there be pain in the ear, apply dry heat, which is best done by the use of a Japanese hot-box. After the "feu" is lighted and placed in the box it should be wrapped loosely in a porous cloth, as fly netting or cheese cloth, and tied with tapes over the painful ear. The heat will continue ceaselessly for four or five hours, particularly if two or three "feus" are employed, and the patient can meantime be sleeping. In lieu of the hot-box, either a hot-water bag, a hot plate wrapped in a towel, or a heated bag of hops, sand or salt may be used. Should either of the latter be selected, a pair will be required so one can be in the oven heating while the other is being applied.

A wet pack worn about the neck at night, and when in the house, will often assist in diminishing the soreness. The pack is made by loosely wringing a towel after having been dipped in ice-cold water. It should then be so folded that it will be about three inches in width and long enough to reach twice about the neck. After applying cover it with a strip of flannel, a dry towel, or still better with a strip of thin rubber cloth, as dentists' rubber dam, or oil silk, in order to retain the moisture. When the wet towel becomes warm, wring out afresh in cold water and re-apply as before, repeating every half hour. In place of the wet pack, if preferred, a bag of heated hops applied about the neck will prove soothing.

Inhaling steam from the spout of a tea-kettle, or from a steam atomizer, three or four times a day when convenient so to do, will also tend to allay the soreness of the throat.

If constipation occurs, take a tablespoonful of epsom salts in water, or else a bottle of the effervescing solution of the citrate of magnesia made ice-cold.

After the first week, in place of the soda gargle, use a weak solution of the chlorate of potash, made by dissolving a teaspoonful of the crystals in a glass of water, and gargle with same every half-hour or hour. If too strong, add more water. Another good gargle is made by adding 10 drops of the tincture of myrrh to two tablespoonfuls of water.

DIET.

Abstain from all alcoholic drinks, tobacco and highly spiced or hot foods.

For the first day or two after the operation depend chiefly upon milk and cream taken ice-cold. If drawn through a straw or glass tube the swallowing will be easier. Ice cream is also recommended. Malted milk (taken in accordance with the printed directions upon the container) will be found to be a most excellent food. Kumyss or Matzoon might also be suggested.

After the first day or two oatmeal in cream, cornmeal mush, cold soups, bread and milk, milk toast, raw or soft-boiled eggs, tapioca pudding, corn starch and cup custard may be eaten. Raw oysters, when in season, may be taken, the smaller size, as blue-points, being preferable, each oyster being cut in two or three pieces which can be easily swallowed. Ralston Health Food deserves particular mention as a food easily eaten and highly nutritious. The same may be said of currant jelly. Usually by the fifth day, and sometimes earlier, the throat has sufficiently improved to permit of indulgence in a more liberal diet, though solid foods had better not be taken until after the first week. By the eighth or ninth day the throat will have sufficiently healed so anything can be eaten as usual.

During the first few days, while the throat is sore, it may be found to be easier to swallow if the tongue is pressed firmly against the front teeth of the upper jaw, while the head is thrown well back. Sometimes better results are attained by pressing the tongue against the lower front teeth and taking liquid food from a spoon introduced well back in the mouth, the head, meantime, being tipped backward as before.

HEMORRHAGE.

In case of bleeding after operation, discontinue regular medicines until bleeding is controlled, and gargle continuously with *very cold ice water made by adding a little water to a glassful of pounded ice.* To this may be added either a little lemon juice, or vinegar, or, still better, a *teaspoonful of powdered alum.* A small piece of ice held in the back part of the mouth is often of value. The same may be said of an ice bag applied about the neck. Ice used as suggested will generally prove efficient. Should the ice gargle not control the bleeding, then take this paper to the nearest druggist and have compounded the following prescription:

℞ Acid Gallic 3i
Acid Tannic 3iii
M et ft pulv

Directions: Put a tablespoonful of the powder in a glass and add a tablespoonful of water, stirring until mixed. Dose, one-half tea-

spoonful swallowed slowly and repeated every one or two minutes. A little of this mixture may also be added to the alum gargle, which should be used during the intervals between the doses of the gallotannic acid mixture.

If after this the bleeding should still continue, call in a near-by physician and *give him this sheet of directions.* In such case I would respectfully make the following suggestions:

Hemorrhage after a tonsil operation is most likely to occur within the first six or twelve hours after operation, and when local anesthesia has been employed is owing to paralysis of the muscular coat of the bleeding vessels so they cannot contract as they normally would. This paralysis is due to the after effect of the cocaine. The hemorrhage will generally be found to be capillary and to be from the entire surface of the wound.

Fainting generally causes a cessation of hemorrhage, therefore, the patient should be *kept standing* with head erect and meantime instructed to *take long and deep breaths.* If, furthermore, the arms are elevated above the head the blood pressure is diminished. As this position becomes tiresome, the clasped hands may be held upon the head. See that the neck is not constricted: *a tight collar,* for example, *should be removed.*

Ergotole used hypodermically is of great value:

℞ Ergotole (S & D) 3ii

S. Inject hypodermically minims XX, repeating same dose in fifteen minutes and even again in another fifteen minutes if required. Three doses are usually sufficient so the desired effect is produced, or toxic symptoms manifested as syncope and nausea, which depress the heart's action, and as above stated tend to control the hemorrhage. *Aseptic ergot* may be used in the same manner.

One hypodermic of morphine, preferably a maximum dose, is to be particularly recommended in lieu of the ergotole in case the latter is not at hand. Norwood's *Tr. Veratrum Viridie,* administered hypodermically (say 5 or 10 minims), has been employed successfully, it being like morphine a cardiac depressant, and furthermore causes nausea. The relaxation from vomiting will often prove effective. With this object the hypodermic administration of 1-10 grain of *apomorphine* has been employed. Bosworth recommends an emetic of zinci sulphas. As cardiac depressants, and relaxing agents, are chiefly indicated, it becomes apparent that *alcohol* in any form *is to be avoided,* as are also hypodermics of strychnia, atropia, etc.

Astringents applied directly to the bleeding area are often effective. The wound should be packed with gauze medicated with the astringent selected. For patent reasons one end of the gauze should be secured outside of the mouth. The following astringents might be suggested:

a. A paste made by adding powdered tannin to a 20 percent solution of antipyrine.

b. Powdered permanganate of potash made in a paste by the addition of 4 percent of vaseline.

c. ℞ Tr. Benzoin Comp. ℥i
Iodoform ℥i M

d. Styptic collodion, which is a combination of collodion, alcohol and tannin.

e. Turpentine.

Adrenalin 1-1000 would naturally occur to one as a proper agent to employ. In my experience it has proven more efficient in preventing hemorrhage than in stopping it after it has begun. In its use there is, though, the danger of recurrence, owing to its secondary effect. If employed at all it should be used, as are the other astringents, by packing the wound with gauze saturated therewith, in which case due credit must be given to the gauze packing, as tonsillar hemorrhages are often controlled by simply packing the wound with unmedicated gauze.

Monsel's Solution is not to be recommended for different reasons. As usually employed, by applying it to the wound with a swab, a coating is formed under which the hemorrhage continues, the blood meantime being swallowed. Furthermore, after its use the wound heals more slowly, hence my preference is for other methods of treatment. It may, however, be effective if gauze moistened therewith is tightly packed into the wound, though, as before stated, due credit must be given to the packing of gauze regardless of the astringent employed. If for any reason iron is used, it must not be applied while there is present any tannin or an inky precipitate will form. The value of *Ferropyrin* has been highly extolled. It is a dry powder consisting of equal parts of the chloride of iron and antipyrin. It is applied to the bleeding area upon gauze, and in case of tonsillar hemorrhage would be packed into the wound. Owing to previously mentioned statements other methods of treatment are to be preferred.

Peroxide of hydrogen is another agent of use for the control of hemorrhage, though it is of but little value in tonsillar hemorrhage.

If used as a gargle an immense amount of froth is produced, under which the bleeding continues, and the *froth may prove a danger if aspirated in the lungs.* The only advisable method of use would be to pack the wound with gauze moistened therewith, in which case the unmedicated gauze would prove nearly if not quite as effective.

The hot-water douche, which is so efficient in controlling surgical hemorrhage generally, might be employed. In such case no good can be expected unless the water is absolutely as hot as can be borne (about 130° Fahr.), and the stream must be *intermittingly applied directly in the wound* by means of a fountain syringe with a long tube, as a metal catheter, the patient meantime holding the breath and leaning well forward. Having the water acidulated with vinegar would probably increase its efficiency. On the whole it is not to be recommended in the treatment of tonsillar hemorrhage, and is only mentioned as a substitute for other treatment in emergency should there not be available other agents required.

Fig. 1. Writer's Tonsil Presser (½ size).

A strong solution of nitrate of silver, say 20 or 25 percent, is one of the best applications for the *prevention* of hemorrhage after a "cautery dissection" operation, by coagulating the albuminous element of the tissue and thus forming a dense coating, but, *after* a hemorrhage has begun, the exuding blood dilutes it and washes it away so as to prevent its acting as it does when applied to a bloodless wound. It furthermore finds its way to the larynx and is thus distressing to the patient.

Continuous pressure, efficiently applied, will probably control any secondary tonsillar hemorrhage to be met with, and is the most practical and surgical method of treating hemorrhage of this kind. This can be done with the thumb, it first being wrapped with gauze. There are special instruments devised for this purpose (figure 1), though any instrument shaped like a *placental forceps,* or even a *small pair of tongs,* can be substituted, both points being wrapped with gauze or muslin, and continuous pressure made therewith. Strong pressure applied externally with the thumb on the carotid might also be tried.

Should it be possible by inspection to recognize a bleeding vessel, it should be *grasped with an artery forceps* and torsion applied, though, as before stated, bleeding from a tonsil wound is most often of an oozing character, and seems to come from the entire surface of the wound. As continuous pressure applied by the hand becomes tiresome to the physician, and very annoying to the patient, it is better to employ, if available, a tonsil hemostat, one form being shown in figure 2.

In any case where there has been a considerable loss of blood certain methods of systemic treatment should be employed.

Bandaging each limb near the trunk will diminish the amount of blood in circulation. If this is done, one bandage at a time should be released, so the circulation of the limb will not be too long obstructed. In this way three limbs can be kept distended with blood.

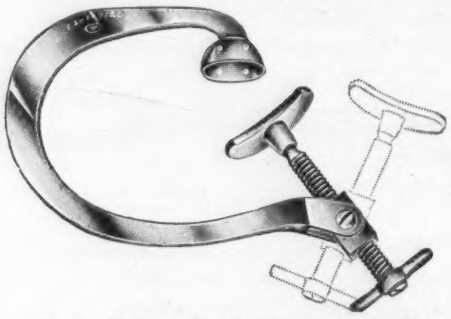


Fig. 2. Writer's Tonsil Hemostat. (½ size).

Chloride of calcium, given by mouth or rectum in doses of ten grains dissolved in two ounces of water, and repeated hourly for three doses, has been employed with benefit in case of persistent and oozing hemorrhage. After the third dose it should be discontinued for a few hours before being again used; 40 to 60 grains in twenty-four hours is regarded as the maximum dose as an antihemorrhagic. The lactate of calcium has also been advised, a single dose of 30 grains in water being given.

Hypodermatoclysis. Should the hemorrhage have been very severe, it is advisable to administer a subcutaneous injection of normal saline fluid into the cellular tissue at the most favorable point, or else, as an alternate, a full enema (½ gallon or more) of the same fluid may be employed.

No. 103 State Street.

EARLY IMMUNIZATION, THE ESSENTIAL FUNCTION OF THE TONSIL.*

BY R. H. GOOD, CHICAGO.

One of the greatest problems under consideration at the present time, by workers along the lines of scientific physiology, pathology and therapeutics, is that of immunity, and I purpose in this paper to show the part the tonsil takes in establishing this condition.

As late as 1907, one of the leading men in the profession, George Bacon Wood, states that "the real reason for the existence of the tonsil has not yet been explained."

The tonsil is so located that it is exposed to bacteria coming to it by way of the nose, mouth, lungs and stomach. Every mouthful of food loaded with micro-organisms is crushed by the tonsil in the act of swallowing. The secretions from the nose are carried toward the tonsillar crypts by the cilia, as demonstrated by Jonathan Wright. The secretions from the lungs are coughed or carried by the cilia directly toward the tonsils. So in the act of vomiting, which is frequent in infants, the contents of the stomach are brought directly in contact with the tonsils.

From these facts one is led to believe that the tonsil must have an important function or else it would not be placed where it is exposed to infection.

The tonsil in the embryo does not develop until the fourth or fifth month, so that we may conclude, first, that whatever be the function of the tonsil it has not functionated prior to this period; and, second, that it cannot have a vital embryonal function or else it would develop earlier in foetal life. At birth the tonsil is fully developed, having matured histological structures, and therefore is able to perform its function.

That the tonsil functionates early in life is suggested, first, by the fact that when tonsils are enucleated after about three years of age, the system knows no loss. Second, the tonsil like adenoids, in healthy children, who have had no attacks of tonsillitis, has a tendency to atrophy or decrease in size from the third or fourth year up to puberty.

Many theoretical functions have been ascribed to the tonsil. Spicer thought it eliminated certain elements from the system,

*Read at the meeting of the Chicago Laryngological and Otological Society, March 9, 1909.

which, however, is proved to be false by chemical analysis of the contents of the crypt. Massini advanced the theory that the tonsil furnished an internal secretion like that of the ductless glands. None of the histological tissues in the tonsil could produce secretions like those found in the ductless glands. Fox considered the tonsil as having the property of absorbing salivary digestion. Gulland gave the tonsil a bactericidal function, namely, that of destroying bacteria which enter the alimentary tract by way of the mouth. The only material in the crypts having this power is the salivary corpuscle, and we know that the great number of bacteria entering the system by way of the mouth are many times more than could possibly be destroyed by the salivary corpuscles. Furthermore, nearly all bacteria when entering the stomach lose their pathogenic potency.

George Bacon Wood has very elaborate drawings with which he attempts to show that the stratified epithelial cells at the bottom of the crypts are transformed into leucocytes, and considers the tonsil the primogenial source of leucocytes. This would overthrow all of our views that the leucocytes have their origin from the original mesoblastic elements.

Notwithstanding the hopeless foundation for the above-mentioned theories, there are some facts which have been demonstrated, that serve as a basis for logical conclusions. For example, Goodale noted, first, that salivary corpuscles possessed phagocytic properties; second that the lymph currents promoted by the ciliated epithelium of the oronasal cavities converge towards the region of the tonsil; third, that this lymph passes into the cervical lymphatics through the tonsils.

Wright noted that foreign particles, such as carmine granules, oil globules, etc., pass with the lymph current through the cryptal epithelium into the tonsil and that living bacteria remain in the crypts.

With these established facts in mind we are in a position to understand clearly the function of immunity performed by the tonsil.

Immunity may be defined as that which prevents the gaining of a foothold by disease germs into the body, or that which neutralizes their harmful products or destroys the organisms.

However, immunity is only relative, and whether an individual suffers from the disease after the germs have been introduced into its system, depends on two factors: the pathogenic potency of the germs, and the vital resistance of the individual. For example, a fowl under ordinary or normal conditions is immune to inocula-

tions with the germs of tetanus, yet if the chicken be compelled to remain in a refrigerator and stand in a piece of ice for a time, it becomes susceptible to the inoculations of tetanus and dies.

An organism may possess an *inherent immunity*, as in the case of the fowl to tetanus, or man to certain diseases affecting animals. This form of immunity is theoretically interesting but practically valueless.

It is the acquired immunities which are of interest to us in the functions of the tonsils. There are two forms, natural acquired immunity and artificially acquired immunity. *Natural acquired immunity* is immunity established by the natural forces of the tissues of the body, when disease organisms exist for a time within the individual, giving their products to its system. This is exemplified in such diseases as tonsillitis, diphtheria, measles, etc.

Artificially acquired immunity, or artificial immunity, is induced by the inoculation with live germs causing the disease, or by the injection of the products of the organism. This product may be found in fluid media after extraction from the bacterial body, or it may be inherent to the bacterial body, in which case the organisms are thoroughly sterilized before injection.

Any material used to induce this immunity by inoculation or injection may be known as vaccine.

A vaccine may be defined as any substance of bacterial origin which, when taken into the body fluids, is capable of inciting an elaboration of protective substances.

Protective substances or antibodies are certain specific substances with antagonistic properties, in the body fluids, which aid the bodily resistance by one of two forces or both,—mechanical, as phagocytosis and opsonic power, and chemico-physiological, as agglutination and bacteriolysis.

All these powers may be present in the resistive manifestations in equal or varying degrees, or one or more may be totally absent.

Agglutination is the process brought about by the union of the bacterial product known as agglutinogen with the substance normally present in the body known as agglutinin, and is manifested by the power of causing evenly distributed bacteria to clump together; in other words, become paralyzed, as is the case in typhoid fever.

Bacteriolysis is the process by which the resistive elements of the tissue bring about a disintegration or lysis of the bacteria.

Opsonic power is the ability the fluids of the body possess in preparing pyogenic bacteria for the process of phagocytosis.

Phagocytosis consists of the destruction of bacteria by a phagocyte, subsequent to preparation of the bacteria by the opsonins.

A phagocyte is any cell which has the power to take within itself a foreign substance and destroy it. It may destroy the substance (bacteria) by a sort of digestive process, or it may, after taking within itself a large amount of foreign material, give itself to the excretory tracts, and thus destroy the substance and itself.

Opsonins are substances distributed throughout the body fluids and are produced as a result of a reaction on the part of the fixed tissue cells to irritation from bacterial substances. They alter the resistance of, or prepare the bacteria so that the phagocytes have the power to ingest them.

Artificially acquired immunity may be established in two ways:

1. By injecting bacteria or their products into an individual whose fixed tissue cells will respond with the formation of protective substances or antibodies. These protective substances aid the bodily resistance by neutralizing the bacterial products or by destroying the bacteria themselves. These protective substances may remain potential for months or years, thus rendering a temporary if not permanent immunity. When immunity is secured in this manner by the sole activity of the cells of the individual affected, it is termed *active immunity.*

2. If the serum of an actively immunized animal be obtained and injected with its protective substances into a second animal, an immunity is established without the cellular activity necessary in active immunization. This process is termed *passive immunity.*

If the serum used in the production of passive immunity contains only the property of neutralizing the toxic products of the infecting bacteria, it is known as *antitoxic passive immunity.* It will be observed that the bacteria against which an antitoxic immunity may be established give off their poisonous substances while alive. The immune serum so produced is known as *antitoxic serum,* and is represented by such serums as antidiphtheritic, tetanic, and the antitoxic serum of botulism.

It is also observed that some bacteria give off a toxin after they are killed and are undergoing disintegration. A serum introduced in passive immunity which destroys the organisms is known as an *antimicrobic serum.* This explains the toxemia following the introduction of antimicrobic serums. Almost all serums on the market are antimicrobic, except those mentioned above. All immunities, except inherent immunity, may be produced through the tonsil, by

any of the processes above described. Natural acquired immunity is brought about by acute inflammatory processes in the tonsil. Artificially acquired immunity is produced by the processes of bacteriolysis, agglutination or opsonic power in the crypts of the tonsil.

The location of the tonsil is such that the bacteria entering the oronasal cavity, from the day of birth, are directed towards the tonsillar crypts. The crypts are lined with stratified epithelium (not columnar), so that they are simply receptacles or culture tubes in which bacteria of every variety, entering the fauces, may be cultivated. The mucus in the crypts serves as the culture medium. The bacteria remain in the crypts, not because the cryptic epithelium has a special selective power, as claimed by Wright, but because, being living organisms, they select the mucus in the crypts in preference to going along with the lymph current underneath the epithelium as is the case with dust particles.

The glands which furnish this culture mucus in the crypts are located just outside the tonsillar structure. (Fig. I.)

Dr. Orndoff has named these glands peritonsillar mucous glands. The glands are compound racemose mucous glands situated around the tonsil in the region of the capsule and its trabeculae. They are found in all tonsils properly enucleated, and they are most numerous at the base of the tonsil near the bottom of the crypts. These glands have ducts which empty into the crypts. This explains how peritonsillar abscesses at times follow follicular tonsillitis.

The bacteria multiplying in the crypts give off products called vaccines, which are taken into the tonsil by the lymph current and thence into the entire system, where they come in contact with the fixed tissue cells, which in turn have the power of producing antibodies, such as opsonins, agglutinins, etc., which, as described above, produce immunity.

We must now describe how the bacteria are removed from the crypts after they have fulfilled their part of immunization. There is neither fight nor affinity between the salivary corpuscle and any particular bacteria so long as the body is not immunized against these bacteria.

To illustrate, pyogenic bacteria entering a crypt of an infant just born will thrive there unmolested by leucocytes until its vaccines absorbed into the system cause the tissue cells to produce opsonins, which come into the crypts with the lymph and prepare the pyogenic bacteria for phagocytosis. The salivary corpuscles now seize

the bacteria and together they are forced out into the oral cavity in the act of swallowing. This process of leaving bacteria in the crypts just long enough to establish immunity and then be carried out by phagocytes produces what has been termed by Dr. Orndoff "tonsillar equilibrium." In the act of deglutition the superior constrictor muscles compress the peritonsillar glands and force the mucus into the crypts, and this same force or pressure forces the contents of the crypts into the oral cavity. The tonsil with its

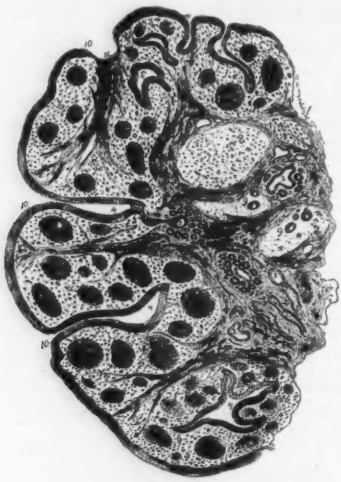


Figure 1.

1. Peritonsillar mucous glands.
2. Ducts of mucous glands opening into crypts through
3. Stomata.
4. Crypts.
5. Lymph follicles.
6. Interfollicular tissue containing lymphocytes and polymorphear leucocytes.
7. Connective tissue.
8. Diseased lymph follicle.
9. Diseased peritonsillar mucous gland.
10. Epithelium.
11. Diseased epithelium.

crypts makes it possible for the system to gradually absorb the vaccines from the crypts and thus produce immunity without systemic toxemia such as we have with acute infections. Agglutination and bacteriolysis can likewise take place in the crypts; the former, coagulating or clumping together the bacteria, the latter, destroying and absorbing them.

The interfollicular tissue is composed of interlacing stellate connective tissue cells whose spaces are filled with lymphocytes and polynuclear leucocytes; thus a tissue is arranged which offers every protection to the general lymphatic system from the insoluble particles (foreign bodies) which pass through the cryptal epithelium.

We shall thus see that the real physiological phenomena found by Goodale, Wood, Wright and others are all required in the process of immunization as brought about through the tonsil.

If the body needs to be immunized to ward off or prevent the invasion of bacteria, it stands to reason that the time when this function is mostly needed is when the infant is first exposed to these bacteria. That the child of one year of age is not thoroughly immunized as yet, is indicated by the fact that the fatality of infants attacked with pneumonia, diphtheria, scarlet fever, etc., is much higher than later in life.

Though the normal tonsil probably functionates until puberty or later, we are nevertheless forced to believe that the time when it is mostly needed is immediately after birth, up to the third or fourth year. That the tonsils are not absolutely needed after this period is shown by the fact that when they are enucleated the system knows no appreciable loss. That the remainder of Waldyer's lymphatic ring may take up this function of the tonsil is quite probable; in other words, the function of Waldyer's lymphatic ring is probably that of early immunization.

The practical conclusions are: first, that in children under two or three years of age, the tonsil when removed should not be completely taken out; second, that only diseased tonsils should be enucleated; and third, when a tonsil has become pathological its function is altered so as to make it possible to become a portal for systemic infection.

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No. 72 Madison Street.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, March 24, 1909.

HARMON SMITH, M. D., Chairman.

PRESENTATION OF PATIENTS.

Case of Bilateral Abductor Paralysis Following Typhoid Fever. Case of Bilateral Abductor Paralysis Associated with Tabes. By WOLFF FREUDENTHAL, M. D.

These two patients are presented to show an affection which gives exactly the same clinical picture, while its etiological factors are widely different.

Case No. 1 came to the clinic complaining of hoarseness and shortness of breath. On inspection, a typical picture of bilateral abductor paralysis was found. On phonation, the vocal cords closed in the median line, and on deep inspiration the left opened a little more than the right, the two being about 2 mm. apart, not more. The man was sent to a neurologist, with the idea that he might be suffering from a tabetic lesion, or multiple sclerosis, but the report was returned that it was a case of hysteria. Dr. Freudenthal said that he had never seen a case of hysteria of this sort, so he asked another neurologist to make an examination, and this time he got a report that there was no evidence of any hysterical condition at all. He then elicited a history that four years ago the man had been sick with typhoid fever, and that his present trouble set in four weeks later—he began to be hoarse and occasionally could not get his breath, and at night he apparently had laryngeal crises,—waking suddenly and finding himself unable to get his breath and thinking that he would suffocate. It is evident that we have to do in this case with a peripheral neuritis, a neuritis which affects other parts of the body as well after typhoid fever.

Case No. 2. This patient has locomotor ataxia and shows clinically the same picture in the larynx. He also is suffering from shortness of breath, etc. He denies any specific infection, but the Wassermann reaction was positive.

It is very interesting to compare these two cases. Whether Case 1 is a toxic condition, as many believe, we do not know. This is the first case of the kind seen by Dr. Freudenthal, but he has seen a number of cases like the other, and in the City of New York there are a great many more than the laryngologists imagine. There are probably half a dozen now at the City Hospital, and at the Montefiore Home they have them in all the different stages of paralysis. Anyone who has not seen such cases will be very welcome to come there and inspect them. There are four or five cases of bilateral abductor paralysis there now, and considering the number that have been reported in the literature that is a good many.

Dr. Gleitsmann said that through the courtesy of Dr. Freudenthal he had the opportunity of examining the patient at his office, after having met the doctor, who had told him of the interesting case. At that time Dr. Freudenthal seemed inclined to consider the abductor paralysis due to general neurosis,—e. g., hysteria, neurasthenia,—whilst he himself could not coincide with this view, as such affections generally produce adductor paralysis, and being cortical lesions are not apt to cause abductor paralysis. Recurrent and abductor paralysis, as a rule, have their origin in the bulbus, but it is well known that a horde of other than cerebral diseases furnish additional etiological factors, e. g., spinal diseases, peripheral causes of all kinds, which latter exceed in frequency the paralyses of central origin.

During a lengthy conversation with the patient, he stated that he had had typhoid fever about four years ago, which of all the toxic elements producing abductor and recurrent paralyses, as described so lucidly last year by Dr. Delavan, is the most frequent one. Dr. Gleitsmann expressed his gratification that Dr. Freudenthal now agrees with him as to the etiological factor. The one interesting point yet remaining to be cleared up is how soon after typhoid fever the patient felt the first throat symptoms, and what is the longest period of time which may be allowed to elapse and yet to attribute to the fever a beginning or existing abductor paralysis.

Dr. Freudenthal said that in the beginning he was inclined to accept the case as one of functional disturbance because the neurologist so positively declared it to be one of hysteria, but after going more carefully into the details and getting the opinion of another neurologist, he changed his opinion, though he could

not yet believe that it was of central origin, for no such lesion appears. He has had the patient examined repeatedly, and as such peripheral neuritis is seen after typhoid fever, he feels forced to accept the case as one of peripheral origin.

Case of Angiosarcoma Removed. By JOHN E. MACKENTY, M.D.

Thomas Carmack, aged sixty-one, born in Austria. Cigar-maker. Rheumatic fever twelve years ago. Gall-stones five years ago, two attacks. On January 15th, noticed that right side of nose was becoming obstructed. About two weeks later, began to have repeated nasal hemorrhages, slight in extent. No pain. He came to the clinic about February 10th.

The right nasal passage was obstructed at the junction of the cartilaginous and bony septum by a pedunculated mass of the size of a bean. In growth had the appearance of granulation tissue and bled freely on the slightest touch. It was removed and sent to the laboratory. The fact that the mass was pedunculated was omitted in the report. A diagnosis of angiosarcoma was returned. The septum was removed. The region of the growth and a rim of healthy tissue surrounding it was taken out in one piece, to avoid the transplantation of malignant cells. The rest of the septum was removed piecemeal.

The main interest in this case centers in Dr. Wright's report:

"P. 4027. Dr. Mackenty. Patient, Thomas Carmack. Age 61. March 13, 1909. Dear Dr. Mackenty: On referring to the two reports I have made you of the nasal septum case and on re-examining the sections, am inclined to reverse my opinion of probably malignancy to one of a growth of benign character. I was unaware until you drew my attention to the matter that the specimens came from the same patient. Nearly all the tumors of the mucous membrane of the septum are so vascular we, as a rule, call them angiomata or angiosarcoma, as the case may be. The first specimen presents to my eye the appearances often seen in malignant growths, and in view of the fact the patient was 61 and the history a short one, it seemed probable that this was the nature of the growth. Had I had the evidence presented by the second specimen, which I take it comes from the mucous membrane, or had it been noted in the history that the tumor was a pedunculated one, I should not have suggested the probability of malignancy. This is one of the numerous instances where structure is no guide to prognosis, for malignancy is a clinical term

and not a histological one. There is a question raised by Henke and others whether such growths should be called angiomata. As this is a matter of momenclature, it is perhaps not important, but the remarks of v. Hansemann in regard to the evidence to be drawn from the structural appearances of these growths as to their malignancy, is instructive. And he declares that many of the angiomata present no differentiation which allows one, from their structure, to say whether they are benign or malignant. This opinion is confirmed by many other histologists. I have found this especially applicable to the vascular tumors of the nasal septum. I have repeatedly been tempted to express a tentative diagnosis of malignancy in such cases, and when I have done so, as in your case, I have usually been mistaken. I am glad to have this opportunity of drawing attention to a class of tumors in which the opinion of the microscopist will frequently give rise to errors in the clinical diagnosis. JONATHAN WRIGHT. Per S."

Dentigerous Cyst. By THOMAS J. HARRIS, M. D.

The little patient is ten years old and first came under Dr. Harris's care in February, 1909. At that time, her mother wrote that she thought the child had a dislocated jaw, the result of an injury. There was a history that last August she was struck over the cheek with a stick. For two weeks there was no swelling, but at the end of that time the cheek began to swell until it reached the condition seen in February. There had been no pain or discharge from the nose, and the child had suffered no serious inconvenience in swallowing, although at times there was a little difficulty. When examined in February, the swelling was very pronounced, and there was a distinct enlargement of the roof of the mouth which extended beyond the median line to the left side. There was also, —rather unusual in these cases,—a slight raising of the floor of the orbit, and some slight bulging of the outer wall of the nose. The condition seemed that of a dentigerous cyst, but definite opinion was reserved until further examination. An X-ray picture was made, but was not very satisfactory. Exploratory puncture was made, through the nose, and very foul pus was evacuated, which suggested that the previous diagnosis was wrong and that we were dealing with an abscess of the antrum. Incision in the mucous membrane of the mouth was made for a radical operation of the antrum, and there was found a parchment-like thinness of bone which did not allow of a careful raising of the periosteum, so that the elevator broke through. It was finally raised, and a

tremendous cavity was found filled with foul pus, together with the polypoid condition of the membrane so commonly met with in chronic empyema of the antrum of Highmore. The usual antrum operation was performed, the anterior wall was removed, and the cavity was cleaned out. A counter opening was made in the nose. In the course of removing the diseased bone the cause of the cyst was discovered, namely a retained canine tooth. On careful examination it can be seen that there is an absence of that tooth and the premolar has taken its place. The tooth was found *in situ* but not erupted. The opening was closed by suture, but the condition of the tissue did not permit healing, and there is at present a defect there. The child's condition has been favorable in every respect. There has been no return to normal of the roof of the mouth, but there is a very distinct decrease in the amount of the swelling in the cheek. A case of so pronounced a degree as this is very rare. Dentigerous cysts are not very uncommon, and probably many are overlooked, but they are usually mild in degree and require only mild measures for a cure. Dr. Harris said that two months ago he reported a typical one in which the cyst cavity was separated from the antrum of Highmore. A radical operation was performed, throwing the cyst into the antrum. A case was reported by Dr. Coakley before the American Laryngological Association in 1903, similar to this present one, which involved the antrum of Highmore, and contained malodorous pus. He removed a section of mucous membrane and found that the cyst wall had entirely pushed the wall of the antrum before it. The diagnosis usually is not difficult. Most cases have fistulae (but in this case there was none). There is no pain, no discharge from the nose, and the simple mechanical test of washing out through the nose is negative. Probably the case will get well more quickly if a thorough operation is performed. Magitol, a Frenchman, thirty years ago wrote very extensively on this subject. They are probably in many cases embryonic, while some are inflammatory, due to a displaced tooth sac or a retained tooth. This case would be one where the tooth was retained.

DR. CARTER inquired what tooth the cyst was connected with, and recalled a case which he had presented some months ago in connection with the discussion of one of Dr. Harris's cases at that time,—a young woman who had a cyst connected with the second bicuspid tooth, and the swelling presented itself entirely on the outer side of the gum and did not extend to the antrum

at all, and instead of containing a purulent secretion it was filled with a mucoid-looking material. The cyst, however, was not large, the outer bony wall was removed and the cyst wall removed with the curette. After some three or four months had elapsed, the epithelium seemed to reach down into and cover the bony walls of the cavity. There was no further trouble with it.

DR. HARRIS replied that the cyst was associated with the canine tooth, and its place was taken by the premolar.

Gumma of the Left Vocal Cord. By THOMAS J. HARRIS, M. D.

The patient is a man forty years of age who gives a history of an initial lesion eighteen years ago. He says that he has had more or less medical treatment and advice, and has been under Dr. Joseph Collins's care for nervous disturbances of a specific origin. He has been better at times, but when he came for treatment he was decidedly worse. On examining the larynx, there is on the anterior third of the left cord a distinct swelling, not pronouncedly red, which renders it difficult for the cords to approximate. There has been no large amount of potash given. He had had none when first seen. He was put upon it a week ago and is now taking 25 drops. There has been a very decided improvement in the symptoms, and a shrinking and softening. There is no tubercular or malignant trouble to be discovered, and, with the distinct history of the recognition of lues and the benefit received from the therapeutic test, there is but little question that it is a case of tertiary lesion of the larynx. The man is well nourished in every respect, and there is no suggestion of lung trouble. Any suggestions would be appreciated.

DR. THURBER said that the therepeutic test would establish the fact of whether or not it was a gumma. Such condition may result in considerable obstruction. In one case, that he could recall, the gumma was on the right false cord and of the size of a walnut. The patient was intubated. She was an adult, but a ten-year tube was as large as could be introduced, and as she began to respond to the iodide, the tube could be taken out.

DR. QUINLAN took exception to the diagnosis on account of its general appearance. The lesion seemed to be a limited infiltration, and unilateral, and there was no evidence of any circumscribed spot breaking down. It had the appearance of a chronic laryngitis with a horny prominence on one side, but the general outline did not give the suggestion of syphilis. However, a lesion existing

so many years, and having a suspicious history, might cause a change of diagnosis. Simply viewing the condition as a laryngologist, he saw nothing to make him regard it as gummatous. It was a case in which observation would determine a more settled view later on.

DR. LEDERMAN said that the case presented by Dr. Harris was very interesting and important. A case of a similar nature had been brought to his office by a physician of some experience in throat work, who wished him to confirm the diagnosis of malignancy, which he had given to the patient. The man was forty-six years old, well nourished. There was no pain, no swelling, no glandular enlargement, merely hoarseness, which had existed for several months. He was a lawyer, and said he could not try his cases in court on account of not being able to speak loudly. The laryngoscopic image showed a mass involving the false and the true cord on the right side. There was some motility of the cord, but the infiltration extended into the ventricle of the larynx and slightly below the cord. No ulceration existed. The man denied any specific history, but after consulting with his physician it was determined to test the case, and he was put upon iodides, in rapidly increasing doses, and in eight weeks' time the gumma had disappeared. Before leaving the office the man said that fifteen or twenty years ago he had noticed a slight abrasion on the penis, but no treatment had been given, and it disappeared, and he had had no trouble up to the present time. It was always a question whether we are able to make a positive diagnosis in these cases, from the macroscopic appearances of the lesions. In this instance the physician was quite positive that specific infection could be eliminated, as the patient absolutely denied such a history. We should not accept such statements as absolute.

DR. SMITH recalled three cases which had been pronounced syphilis of the larynx, two of which had been presented before the Section, and all three turned out to be epithelioma. In the case presented there was some restricted movement on the left side, which suggested malignant disease, and the macrosocopic appearance did not suggest syphilis. He would run the iodides up, but would not let that influence him even if the tumor cleared up under such treatment, for one of the patients referred to gave all the evidence of syphilis under the iodides and was about to be dismissed, when a tumor appeared which proved to be epithelioma, and a tracheotomy had to be performed. Where there is a syphi-

litic history, one must be more than cautious in regard to a diagnosis.

DR. HARRIS said that he heartily indorsed Dr. Smith's remarks, but could not agree with what Dr. Quinlan had said, that it was simply a chronic laryngitis. He had little doubt but that in the broadest sense it was specific, but it might be more than lues. The therapeutic test and the laryngoscopic picture were most suggestive of syphilitic lesion, but he agreed that it was most important to bear in mind the deceptive appearance of epithelioma. He would keep the case under observation, but did not feel that he was justified in removing tissue for a microscopic examination, though that may be called for later. There has been a distinct improvement in the growth in a week's time under 25 drops of potash three times a day. Later he would again present the case, or report what progress it is making.

In regard to Dr. Freudenthal's patient, he was much interested in what the Doctor had said about a peripheral origin or cause for bilateral abductor paralysis. He did not know that anyone was taking that position to-day, but thought that pathologists were generally agreed that it was of central origin, and he would be very glad if Dr. Freudenthal would explain his position more in detail.

Coin Removed from Esophagus. By DUNCAN MACPHERSON, M.D.

This case is not reported because of any especial dexterity required for removal, a coin being about as easy an object as any to remove with the Jackson tube. The interesting feature is the fact that the coin was arrested opposite the suprasternal notch after it had passed the supposedly narrowest part of the esophagus, i. e., the beginning or the part about opposite the cricoid cartilage. In most cases objects larger than a nickel are passed through the esophagus and into the stomach without being arrested. In this case a large thymus may have been present, but the child left the hospital too early for an examination to be made. The coin was in the esophagus for ten days before it was removed, and the child had been in a general hospital for that length of time. The family physician located the coin later by means of the X-ray. The main symptom was difficulty in swallowing.

Chronic Stenosis of Larynx Requiring Permanent Use of Tube, Overcome by Dilatation. By D. B. DELAVAN, M. D.

(Published in full in this issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. DOUGLASS inquired if when the tube was finally removed the patient's larynx was in the same condition as seen to-night,—with

the evidence of cicatricial tissue almost disappeared, and the right cord as visible as now.

DR. HARRIS wished to know whether Dr. Delavan now regarded this as the most modern and up-to-date treatment for such a condition, and whether he had considered the new operation of laryngostomy for the case. Sargnon has reported 13 cases treated in this way with most brilliant results, and Dr. Jackson is to report five cases at the next meeting of the Tri-logical Society. If that operation were applicable to a case of this kind it would save much trouble to the patient and the surgeon as well.

DR. GLEITSMANN said that the operation of laryngostomy is chiefly cultivated by the French surgeons, amongst whom Sargnon and Barlatier have operated the largest number of cases and have published a series of cases describing the operation, the improvements made, and the results obtained. The French authors as well as others give credit to Prof. Killian as being the first to devise the operation. He communicated his idea to Sargnon in the interest of one of the latter's patients, and gave an outline of the proceedings of 1906 in the Transactions of the South German Laryngologists. The operation is indicated in chronic stenosis of the larynx and upper trachea, in consequence of prolonged wearing of intubation tubes, or tracheal canulas, and in the various stenoses arising from cicatricial processes. Briefly, it consists in laryngotomy with an incision to the upper edge of the thyroid cartilage, if necessary extending through the tracheal rings to the canula. The obstructing cicatricial tissue is incised in the median line down to the cricoid plate until sufficient space has been gained to insert a drainage tube. For the latter, a yellow rubber tube is used which reaches above to the upper edge of the arytenoid cartilage, while the lower end rests on the tracheal canula. In the beginning, the tube is changed daily; later on, every second day. After about a month, epidermization of the wound commences and thicker tubes are inserted to reach the normal laryngeal lumen. Sargnon and Barlatier published records of twelve cases, seven of which were cured, four were still under treatment, and one died.

The procedures of Melzi and Cagunla, who claim to have operated on two cases before Sargnon, differ in two points: viz., they prefer not only to incise but to excise all cicatricial tissue, and instead of the yellow rubber tube they use a cylindrical tampon made of a small piece of wood covered with iodoform gauze which

absorbs secretion from above, and is increased in size according to the larger opening created.

DR. DELAVAN, in closing the discussion, said in reply to Dr. Douglass's inquiry that the patient's larynx was in better condition today than it was eighteen months ago when the tube was first removed, for there were then considerable areas of thickening anteriorly, as well as at the posterior commissure and when the tube was removed it was a question whether the thickening would subside or increase. If it had continued to increase as it had on former occasions the case would have been practically hopeless. Instead of that, however, it contracted and the appearance of the larynx to-day was better than he ever expected to see it. The presence of the tube had to a certain degree aggravated the condition during the time that the tube employed had been made of metal. The wearing of a tube of hard rubber had been less irritating.

Replying to Dr. Harris's inquiry as to whether a laryngostomy would not have been better and hastened the result, Dr. Delavan said that question had been partly answered by Dr. Gleitsmann. The question was certainly an interesting one, for there is no doubt but that dilatation by intubation is a serious process, trying to the patient, difficult of performance, and often attended with much pain. The average patient would have hardly persevered as did the one presented. She, however, is a person of unusual intelligence and courage, and of superior physical powers. In properly selected cases the improved operation would undoubtedly be welcomed, though as yet we know little of the results of it, and can only speak of it theoretically. At present it was difficult to say whether or not it would have been better in the case presented than the method pursued.

DR. LEDERMAN said that Dr. Delavan's case was especially interesting to him in view of a recent case of cicatricial stenosis of the larynx following typhoid fever in a man thirty-five years of age, who had been wearing a tracheotomy tube, and had applied for relief from the unpleasant conditions associated with the tube. The false and the true cord had become agglutinated, leaving but a small opening in the posterior glottic fissure. Gradual dilatation with Schroetter bougies was tried. After a few treatments a small O'Dwyer's intubation tube was introduced, and the tracheotomy wound was permitted to close. He wore this tube for four to six weeks. All the preparations were made to change the tube for a

larger size. The patient was placed in a chair in the upright position, with the tracheotomy instruments near at hand. On removing the tube, the patient became very much flurried, and, although the laryngeal opening was larger than before, he resisted all efforts to introduce the larger tube, gasped for breath, and rapidly became cyanosed, and it was necessary to do a prompt tracheotomy in the sitting posture to save the man's life. He recovered in a short time, but was satisfied to keep on with the tracheotomy tube, and would not undergo further treatment.

Another case was that of a young girl from out of town, who was seen two months ago. She was sixteen years of age, and had been wearing a tube for twelve years, following diphtheretic stenosis. A distinct subglottic web could be seen with the mirror. The vocal cords were not involved, and a fair voice was present. She breathed comfortably through the tube, and even without it for a short time. She was told that there were two methods of treatment—either intubation with gradual changing of the tubes for larger sizes, or laryngostomy, with removal of the obstructing tissue. The patient did not decide to follow either line of treatment.

Partial Laryngectomy for Epithelioma of the Larynx: No Recurrence in eleven years. By D. B. DELAVAN, M. D.

This patient had been called west upon a trip as a traveling salesman, and was unable to be present. It was something to say that he was able to follow such a vocation successfully eleven years after the loss of the larynx.

Leucoplakia. By BEAMAN DOUGLASS, M. D.

The patient, excepting for his mouth, is perfectly healthy. Denies syphilis. He is forty-nine years of age, and smokes a pipe a good deal. For twenty years he has had inflammation of the mouth which has varied in severity from month to month, involving one or both sides, sometimes one and sometimes the other, until finally about twenty years ago it settled definitely in the mucous membrane of the right side of the mouth between the buccal and the gingival mucous membrane, where it developed a marked white patch. To-day it is a characteristic case of leucoplakia. It is especially interesting on account of the chronicity and extent of the lesion, and its papillary condition. It is unusually white and unusually papilliform. It looked infiltrated, and the first impression on seeing it was that it had degenerated into the epitheliomatous condition that most of these cases reach after twenty years. A large piece of tissue has been removed and ex-

amined, however, and the report is that as yet there are no epithelial elements and no apparent tendency to a malignant condition. No one can tell the ultimate outcome of the case, but suggestions for treatment would be appreciated.

PRESENTATION OF PAPERS.

Scleroma of the Upper Respiratory Tract, with Report of Two Cases: Rhino-pharyngo-laryngo-scleroma and Rhino-pharyngo - scleroma (Vaccine Treatment). By J. H. GUENTZER, M. D.

(*Published in abstract in this issue of* THE LARYNGOSCOPE).

DISCUSSION.

DR. DOUGLASS said that the paper was a most interesting one and had been evidently prepared with unusual care. These cases always interest men who see them first on their visits to Europe and Vienna, and the interest generally continues, for most men see one or two cases a year, as they are chronic in character and drift from one clinic or dispensary to another, giving everybody a chance to study the disease. Dr. Douglass has had no experience with the vaccine treatment of the condition, but it seems a plausible one from several standpoints, because it is an infectious condition, and because it is chronic. It seems comparable to a chronic tuberculosis in the nature of its curability, and as Wright and Douglass have reported their experiments it seems possible that this treatment may be of some use in these almost hopeless cases. In Warsaw and Vienna, where most of these cases are seen, the attitude toward a cure is almost hopeless. In the cases that have come under his observation here the course of the disease as regards both extensiveness and severity was altogether different from those seen in Europe. This is a most important difference, for it means that in this climate, which is not favorable for the progress of the disease, we may hope for better results than are obtained on the other side. In Europe it is common for them to relapse after treatment and go through the old course until they are almost hopeless. In this country they are much slower in progress, and are in much better condition than they ever are in Europe. In the woman exhibited to-night, presenting one of the most typical cases of rhinoscleroma of the pharynx that he has ever seen, the disease was quite as active as any he had ever seen in Vienna. He could not say how severe the case was before the Doctor treated it with vaccine, but it did not seem to be in very good condition or appear to have been materially changed by the treatment; but there was no question

as to the favorable condition of the second case. This man's nose is in excellent shape. He does not, however, demonstrate a very advanced lesion, as it has not yet extended into the pharynx or naso-pharynx. This would indicate a more favorable condition for treatment, and a more hopeful prognosis.

He hoped that all had examined the specimens shown under the microscope, for they were especially interesting and valuable.

Dr. Smith said that he had seen the woman when she first came into the clinic, and at that time and for a little while afterward he made no positive diagnosis, although of course he had in mind a positive scleroma, but on account of the destruction in the pharynx and the impossibility of getting any personal history he held the diagnosis in abeyance. There is, however, a very marked change for the better in her condition; and he hoped that those who see these cases would interest themselves more in the condition and go into it more thoroughly. He had read Dr. Guentzer's entire paper, and it completely covers the nature and history of the disease.

Dr. Guentzer said that he had nothing further to add except in the way of treatment. In the recent literature of the subject there is a good deal of favorable comment in regard to results obtained from the X-ray. In January, Rydygier, Jr., on the other side, reported fourteen cases treated and cured by the X-ray, thirteen of the patients being girls ranging from seven to twenty years of age. This writer claims to have cured a case by the X-ray as early as 1902, which was reported before the Congress of Polish Surgeons, and there has been no recurrence in the six years that have followed. That speaks very well for the X-ray. Of course, that is an easy way of treating these cases, and does not require anything like the amount of work that the vaccine treatment does. He does not contend that the latter is an absolute cure, but in the case of the boy presented to-night it has certainly created quite a local immunity, for he was very badly off, and could hardly breathe at all. Nothing was done for him outside of tracheotomy, except to use these injections, and he has been improving right along. Whether the tracheotomy alone could have had such an effect on the larynx, he could not say, but he did not think it would have improved the upper part of the respiratory tract, the nose and pharynx. Nor could he say in how far the change of environment to the hospital, with better nourishment and improved hygienic conditions, helped to better his condition.

SCLEROMA OF THE UPPER RESPIRATORY TRACT, WITH A REPORT OF TWO CASES: RHINO-PHARYNGO-LARYNGO-SCLEROMA AND RHINO-PHARYNGO-SCLEROMA (VACCINE TREATMENT).*

BY J. H. GUNTZER, B. SC., M. D., NEW YORK.

In this paper the author has correlated all the collected facts regarding scleroma of the upper respiratory tracts which came to his notice during an extended search bearing upon the subject.

At first met with in the clinics of the dermatologists, the majority of cases are now seen by the rhinologists, owing to the distressing symptoms mostly referable to the nose and pharynx. In 1870 Hebra described rhinoscleroma, a tumor form, as seen by him in nine cases, which he thought from the beginning to be syphilis, but upon which antisyphilitic treatment had no effect. He remembers having seen a case in Paris, in 1852, which he thinks was probably this disease. Kaposi in this same year gave the first histological description of the disease, finding a small round-celled infiltration of the corium and papillae, which he likened to a glio—or granulation—sarcoma. Weinlecher states that in 1860 he had observed this disease in seven cases in Professor Schu's clinic in Vienna, and thought them to be either syphilis or sarcoma. At this time nothing was known of the etiogenesis of the disease, though in 1872 Gerber asserted that it was due to some chronic inflammatory irritation, a view which has since been substantiated.

Scleroma has neither a geographical boundary nor an ethnical limit. Cases have been reported from most European countries, from Egypt, India, Australia, Japan, Hawaii, North, South, and Central America. *Endemic* in Russia, Austria, Eastern Prussia and Central America, in all other countries the cases are met with in the foreign born, although Kornfeld reports two cases in Egypt in natives who had never left the country. Sporadic cases are rare in the scleroma-free countries. The disease respects no climate, thriving as well in the rigorous North as in the tropical South, and being about equally divided between the sexes. Up to 1903 about six hundred and fifty cases had been reported, the endemic regions in Russia, Austria, and Eastern Prussia furnishing the greatest number.

*Author's abstract of paper presented before the Section on Laryngology and Rhinology of the New York Academy of Medicine, March 24, 1909.

Scleroma of the upper respiratory tract may be defined as a chronic infectious granuloma pursuing a slow, progressive course, and characterized by a nodular infiltration of the nasal vestibule which steadily increases, growing outward and inward to complete closure of both nostrils and marked narrowing of the choanae,—this nodular infiltration later on changing the surface contour of the nose, perhaps invading the pharynx, larynx, trachea and bronchi. It is always regional and of a distinct type; in the nose, the inferior meatus in both the turbinal and septal regions is most affected. The sense of smell being preserved in all cases, the upper part of the middle meatus as well as the superior meatus (olfactory distribution) is probably affected not at all, or very slightly. In the naso-pharynx the most generally affected region is the plicae-salpingo-palatine, while the pharynx is oftenest affected at the posterior alveolar arches, the free borders, post-pharyngeal wall, tonsils and pillars. In the larynx the disease is mostly found in the subglottic space, then in the region of the petiolus epiglottidis on the posterior surface, the posterior wall being seldom affected. The rarest location is the mucous membrane of the mouth. Out of Baurowicz's one hundred cases only one had the tongue diseased, and only once did he see the hard palate affected. Zeissl reports a case where the scleroma showed on the skin of the arm and on the pharynx, and states that Elzina and Pawlow saw scleroma extending through the fissura orbitalis into the orbital cavity causing an exophthalmos, while Pick found a scleromal tumor in the external auditory canal. A very rare case was observed by v. Schroetter with great contraction of the pharynx and ankylosis of the jawbones. Mikulicz observed the disease extend around the mouth and almost obliterate the oral opening; he also points out the fact that "rhinoscleroma does not affect bone by either caries or necrosis." Koschier, however, found soft bone on the removal of scleromatous tissue from the nose, and in one of Streit's cases the septum was soft and easily broken through.

The precise point of origin of the disease has never been demonstrated. Bojew states that it does not necessarily begin in the nose, but that its origin may be from any part of the respiratory tract. While the disease is nearly always symmetrically divided, it is occasionally unilateral. Pawlowsky, Zwilliger, Freudenthal, and Schein report atypical cases.

While primary laryngeal cases are generally admitted to be very rare, Paltauf out of fifteen cases found the disease limited seven times to the larynx and trachea, a rather high percentage, com-

pared with the 87 cases of Wolkowitsch with 5 limited to the larynx and Juffinger's 38 cases with 5 limited to the larynx. Baurowicz, Catti, Pieniazek, Lumin, Kobler, Lustgarten, E. Mayer, and Rydygier, Jr., have all reported cases of primary laryngeal scleroma. Extension to the bronchi has been found upon necropsy twice by Straganow and once by v. Schroetter.

Its slow and insidious growth, its chronicity, and its unknown focus of origin, render it difficult to say at what age the scleroma process begins. Gottheil in a recent article asserts that "he knows of no case in childhood. All cases occur in the third decennium or later." In more recent years, however, so many cases have come to the rhinologists during adolescence in the same advanced stage, that considering its slow growth the contention is strong that it may begin in childhood, at least some years before these adolescent cases come under observation. Streit found the disease at the ages of fourteen and twenty; one of the author's cases came under observation at nineteen and claims to have had the disease since his seventh year, and Dr. Freudenthal has had under treatment a rhinoscleromatous child nine years old. Wolkowitsch reports a case of a boy of twelve who had had the disease for eleven years; Rydygier, Jr., and Baurowicz both report cases in children, and O. Mayer claims that most cases are afflicted between the ages of fifteen and twenty-five.

Etiology.—Scleroma has no racial predilection, its occurrence rather depending upon the cultural, economic, or material condition of the people. With only a few exceptions it is confined to the poorer classes, and lax hygienic surroundings are the chief predisposing factors. Frisch, in 1882, demonstrated a more definite factor for the etiology of the disease, describing a peculiar bacillus in the rhinoscleromatous tissue, finding it in the cells, between them, and in the interfibrillary spaces of the connective tissue. The author goes on to describe very fully the morphology of the Frisch bacillus. De Simoni questions whether or not these bacilli may not be the accidental guests of the nasal mucous membrane, and claims that he found an identical capsule bacillus in ozena, and considers all like bacilli only a form of the Friedlander pneumobacillus. Perkins, in a study on the subject, concludes that "the endemic quality of the disease, the apparent absence of transmission by contact in spite of the number of organisms in the nasal exudate and the sporadic type of the disease outside of its narrow endemic limits, are all against the rhinoscleroma bacillus as a causative factor, and its presence in the cells is due to secondary in-

vasion or ingestion rather than to infection." Von Babes asserts that "there have been no conclusive grounds found upon which to assign for the Frisch bacillus a primitive role in the tumor formation." Dittrich considers the disease due to a mixed infection; Lissauer cites Klemperer and Scheier that "the rhinoscleroma bacillus and the ozena bacillus are identical with the Friedlander bacillus and that they are largely increased in scleroma and ozena." Wolkowitsch does not believe that the Frisch bacillus stands in any causative relation to the disease, but does so stand to the cell degeneration.

Biological experiments with the Frisch bacillus have been tried by investigators upon the various laboratory animals with few positive results. * * * The time factor has probably been overlooked in a good many of these experiments, and, as Marshalko so aptly states, "after inoculation, a few weeks or a few months may not be long enough to cause rhinoscleroma, since it is a very chronic disease and the infection goes on a long while before it shows any symptoms." Although most attempts to propagate the disease by inoculation have been futile, and though dissenting from some of the opinions noted, in view of the fact that the so-called Frisch bacillus is constantly found in certain parts of the scleroma tissue, and a pure culture of the bacillus is always obtainable from the tissue or the exudate, and since local immunity and improvement was obtained with a vaccine of the Frisch bacilli, it may be accepted that the Frisch bacillus plays an important role in the causation of scleroma.

Infection and Contagion. From the time that Frisch demonstrated the bacillus which is always present in the tissue of scleroma, excepting the few dissenting voices noted, it is admitted by most writers on the subject to be an infectious disease. In both of the author's cases 10 cc. of blood drawn from the median basilic vein and cultured in bouillon for 72 hours showed sterile smears, hence the infection is probably only local and not systemic. Some admit its bacterial pathogenesis but class it with the symbiotic infections. Instances that bespeak the contagious nature of scleroma have been published by Streit, who reports 18 cases with positive diagnosis; he found other members of the family afflicted with the disease in four instances, also two instances in which from the history it was shown that others in the family had very likely died from the disease. In another communication he mentions 10 cases within an area of three square miles, in which three members were afflicted in one family, two in another, and two cases

lived in the same village. Baurowicz admits that even if its degree of contagion is slight, still a number of cases are observed in the same place, and where more than one member of the same family have been diseased; he saw two sisters, and at another time two brothers affected. In consequence of its situation in the upper respiratory tract he is led to believe that it is an "air-borne disease." O. Mayer cites an instance where a mother and daughter were afflicted in one family; and the mother's sister, her husband, and their daughter were also affected. In another instance he mentions a husband and wife as subjects of the disease. He makes the point that its contagiousness is probably mild, since patients have been utilized as nurses in some hospitals with no enforced isolation, yet in this close relation no case of contagion has come to notice. Fomites may play some role in its extension, and the writer believes that coughing, expectorating, and sneezing may be disseminating agents, and that an insect or a parasite may be responsible for its transmission from one individual to another. Liuck considers scleroma contagious, and finds an added danger in the fact that these patients do not feel sick, and so mingle freely with others. Intimate and prolonged association may have something to do with infection or contagion.

Though far away from the endemic centres, some time in the future, near or remote, perhaps the emigration or national health authorities in the United States may have to reckon with this disease, and for cogent reasons may possibly have to consider deportation or some other appropriate, if less harsh, but not less stringent regulation to limit this horrible and pitiable disease.

The histo-pathology of the condition is discussed in the paper, at length, concluding:—"We have, then, this triad of histo-pathological conditions that make up the microscopical picture of rhinoscleroma, viz., the bacilli, and these mostly in their generally accepted habitat,—the Mikulicz cells, and the hyaline bodies. But the warning must be heeded and a large enough piece of the diseased tissue for a proper examination utilized, otherwise, as already pointed out, a false histological diagnosis will result."

Symptoms and Clinical Course. In most cases there are no changes in the contour of the nose externally which would cause suspicion, except in the later stages. When these changes occur, the nose may become greatly enlarged, especially broad over the bridge; or there may be nodal enlargements, flat or raised, over the lateral nasal cartilages, on top of the nose, at the alae, septum, and at the junction of the vestibule and lips. These nodes are some-

times sharply defined. The adjoining skin has a normal appearance, but at times is reddened. Hard nodular excrescences are seen on the upper lip, at the junction of the nasal vestibule and alae, and of the septum and lips, in color light or brown red, sometimes crossed by dilated vessels, smooth, shining, without hair, and covered by a dry cracked epidermis, which at times is bathed in moisture or else covered by crusts. These nodes and excrescences are painless except on pressure. From the upper lip they may extend to the lower lip, encircling the mouth.

Premonitory symptoms are wanting, unless the chronic catarrhal "rhinitis skleromatosa" of Streit can be considered as such. Usually repeated epistaxis is noted, with later crusting and foul-smelling nasal secretion. A mousey and garlic-like odor, which some claim as characteristic and which is realized by the patients themselves since their smell sense is intact, was observed in these cases. Rarely cases with wide nasal chambers and the peculiar odor may resemble ozena, as cited by Streit. With the thickening of the interior soft parts of the nose, sometimes to entire occlusion, and with the advance of the disease to the Eustachian tube, deafness and tinnitus may be complained of. Loss of taste, or difficulty in protruding the tongue, occurs when that organ is affected. Pain on swallowing is due to extension to the palate and fauces. Ankylosis of the jaw, due to adhesions, has been observed, as well as almost entire obliteration of the oral opening. Dryness of the mouth and pharynx, hoarseness, difficult nasal breathing, and nasal intonation of the voice are common. In consequence of the disease extending to the fauces and mouth, causing pain and contractions, the nutrition of the patient may suffer; usually they are robust and suffer no cachexia,—at least during the early stages. Later, loss of weight ensues. In the train of the disease as it advances follow frontal headache and pains radiating to the ears, jaws, mouth, and throat. In the nose and pharynx, the nodular infiltration appears at first soft, dark red, circumscribed, and uneven; later, it takes on a grayish-white color, becomes hard, diffuse, and reaches deep into the submucous tissue, but so far as known it does not affect the cartilage of the nose. * * * The thickening of the tonsils and pillars greatly narrows the fauces, and they have the same studded or mottled red and white appearance as the surrounding tissues.

With the advent of the disease to the larynx, hoarseness, cough, expectoration, and dyspnoea manifest themselves. The process here is subcordal, beginning anteriorly and gradually growing back-

ward below the processus vocales; rarely it may grow in a reversed way. It appears in the form of a "chorditis vocalis inferioris hypertrophica," adherent to the surface of the cords, and as seen above in the pharynx and naso-pharynx is at first red, later becoming paler, and reaching the same shrinking stage, thus bringing the vocal cords closer together and so encroaching on the glottic opening. Extension to the trachea and bronchi have much to do with the irritable and metallic cough of some patients. Pulmonary symptoms are usually wanting, excepting where laryngeal and bronchial involvement takes place, when the physical signs and symptoms of air-hunger are in evidence. The affection of the larynx in this disease has often been said to resemble "Stoerk's blenorrhoea," with which it has much in common symptomatically. The laryngeal cartilages are probably never affected.

Metastasis.—Metastasis in rhinoscleroma is admitted by only a few of the many foreign writers, and Wolkowitsch and Lang are emphatic in their statement that metastasis does not take place in rhinoscleroma.

Diagnosis.—Gerber's eight points of diagnosis are as follows:

1. Changes of the nose externally which would cause suspicion are wanting in most cases.

2. The occlusion of the nose, which is often the beginning of the disease, shows on rhinoscopic examination to be due to the thick, rigid, at the beginning soft,—later more or less nodular,—swellings of the mucous membrane of both the septum and turbinates, and which sooner or later fill up the entire nose.

3. These typical changes, which are not always found anteriorly but are seen first, with posterior rhinoscopy, as a narrowing of the choanae from thickening of the septum, the Eustachian prominences, and the lateral folds of the mucous membrane.

4. Often the pharynx is found normal on direct examination, but here, too, in some cases, we see scleromal infiltration, which reminds one of syphilis and tuberculosis, hypertrophies, contractions, and tumefactions of the soft palate and the posterior pharyngeal wall.

5. Sooner or later, mostly in the very chronic course of the disease, the larynx becomes affected by the stenosis due to subglottic swelling; the swelling may be above the chink. In some cases the larynx is primarily affected and the disease extends upward.

6. The secretions may be normal, in other cases may show a picture of ozena and "ozena trachealis."

7. It is characteristic of these thickenings, excepting in the very beginning, that they are hard, tough, and rigid, and do not ulcerate, although a superficial secondary erosion is seen now and then.

8. Finally, the microscopical examination will show the Mikulicz cells and the bacilli of Frisch.

Gerber "thinks a good many of the scleroma patients have brothers and sisters die from the disease in their country districts whose deaths are supposedly due to consumption. This is not astonishing if an examination of the nose, pharynx, or throat is not made, or if the secretions from the nose and swollen tissues are not examined, since the patient becomes hoarse, coughs, has expectoration of tough mucus, is dyspnoeic, and slowly becomes cachectic, loses weight, and finally succumbs. What could it be if not consumption?"

It may be that here, too, in the United States, some of the scleroma cases are accepted for treatment as either syphilis or tuberculosis, the clinical symptoms and the objective appearances of scleroma at certain stages lending semblance to either of these diseases. In view of this, it is more than likely that the diagnosis of scleroma of the upper respiratory tract is not as readily made as some of the authors so confidently assert; and this is borne out also, aside from the symptoms and appearances, when we recall that the histopathological findings are not pathognomonic for this disease alone but are found as concomitants of many diseases.

The bacteriology of this disease must be proven by growing the Frisch bacillus in a pure culture from the infected regions, in order to assure a correct diagnosis, yet that this alone is insufficient has been exemplified in a case reported by Schilling. It is then probably true that for diagnosis too much reliance cannot be placed upon either the histo-pathology or the bacteriology, but that these must be combined, with the addition of a consideration of the clinical course or history of the disease—an important factor often receiving too little attention or at times overlooked. With this triple combination, and by elimination, distinguishing scleroma from the like-appearing diseases, a correct diagnosis will be attained.

From the time that rhinoscleroma was indentified as a special disease, many efforts have been made to alleviate the harassing symptoms as well as to cure the terrible affliction. At first surgery was given full play, but was soon followed by recurrences, even when exercised in a most radical manner. Later injections were made of various solutions, but in most cases without effect. According to favorable reports in later years the X-ray treatment

seems to give the best results in this disease. Fittig, Schein, E. Mayer (Berlin), Politzer, Emil Mayer, Ballin, Lustgarten, Gottheil, and Rydygier, Jr., have all reported cases treated with the X-ray. It seems to be the consensus of opinion to use a soft tube, covering with sheet lead with a window cut out, large enough to have the rays act on the deep parts. Stern recommends short exposures with high frequency, rather than long exposures with low frequency—exposing from three to five minutes at a distance of three to four inches three times a week.

Lustgarten, in 1907, reported a case of primary laryngeal scleroma in a girl eighteen years of age, in which after one exposure to the X-ray the dyspnoea became so great that the larynx and trachea had to be opened by an incision 2½ to 3 inches in length; the wound was retracted and the X-ray applied to the larynx direct. The first two exposures were made under an anesthetic, the other applications without it. The tumor disappeared almost entirely after only six or seven exposures. Emil Mayer also reported a case with laryngeal involvement, exposing by incision the larynx and trachea and applying the X-ray in about the same manner, with apparent cure and no recurrence after more than a year. Rydygier, Jr., claims to have effected complete cures, having observed no recurrence, for as long a period as six years.

Surgery proper may be indicated to relieve the distress of the nasal occlusion and pharyngeal narrowing, and is imperative in the laryngeal cases with danger of suffocation, as well as a means for directing the X-ray treatment; here tracheotomy or laryngo-tracheal fissure are elective.

Some authors cite cases of spontaneous recovery after attacks of other infections.

Before the author was conversant with much of the literature cited, he determined to attempt an autogenous vaccine treatment, since the X-ray had failed to improve a patient's condition and the Frisch bacillus was so easily cultured. The positively good result in the first case, at least for nearly a year, can only be ascribed to the vaccine treatment; a slight recurrence in one nostril only occurring after the patient had left the hospital and become irregular in attendance for inoculations. Upon the second case the vaccine treatment had less effect, causing no regressive action, but seemed to stem further invasion. Why so great a difference in result is observed in these two cases under the same treatment is difficult to say, unless a certain amount of personal equation comes into play along with a variation in the degree of virulence of the scle-

roma infection, as is often known to be the case with infectious diseases. With so limited an experience, it is not intended to bring forward the vaccine treatment as a positive cure for this disease, although there seems reason to deduce that continued for a long period and frequently applied a cure would be affected by the vaccine treatment alone. Preference should be given to the X-ray treatment on account of its easy, painless administration and its more rapid effect. Vaccine injections are somewhat painful and would have to be used frequently and for a longer time, aside from the consideration that the preparation of vaccine requires much time, many tedious and exacting laboratory steps. Where, however, the X-ray is unavailable, the vaccine could be used, or it might be used as an adjuvant to the X-ray, the ultimate improvement in either mode of treatment being probably due to a local leucocytosis, this bringing about phagocytosis and local immunity.

Duration and Prognosis. The duration of scleroma is variable, cases having been diseased for as long a period as thirty years. Up to a short time ago the prognosis in regard to life has been a relative one, depending upon the parts affected, having been particularly bad when the larynx was affected. Since the X-ray treatment has been advanced and proven to be an efficient therapeutic agent, and with the added local immunity, if no more, that can be brought about with vaccine therapy, as instanced in the two cases here reported, much of the horror of scleroma is relegated to the past.

Case I. H. S., single, aged nineteen, native of Minsk in Western Russia. In this country three years. Came to Dr. Jonathan Wright's clinic at the Manhattan Eye, Ear and Throat Hospital December 5, 1907. Two months previously had been treated at the Mt. Sinai Hospital for rhinoscleroma, being X-rayed for four weeks with slight improvement in breathing. Diagnosis confirmed. Physical condition healthy and well developed. The nose was enlarged and deformed, the tissues of the upper respiratory tract showed a general thickening; abdomen and chest negative; hands cold and cyanotic. Family history negative. Had the common diseases of childhood; when seven years of age was under treatment for some nasal condition, and from that time had nasal swelling which became worse in snowy weather. Gradually the pharynx and larynx became involved, and he had difficulty in breathing and swallowing; slight exertion caused dyspnoea. No specific history, no trauma. Nose has been enlarged for ten years across the

bridge, but has not increased during the past two years. For the past six months he is hoarse and coughs. Sense of smell intact.

He was X-rayed for two months, tri-weekly, with no improvement. Laryngeal stenosis becoming greater, with alarming dyspnoea, the patient was admitted to the ward and a low tracheotomy was performed on March 10. The trachea as observed through the wound was normal. After twenty-four hours the steam tent was removed, and on the third day the patient was up and comfortable.

On April 21st the patient complained of earache in the left ear, and a paracentesis was performed, followed by the usual treatment, and the discharge ceased on the 29th. Culture from the discharge showed the Frisch bacillus. On May 26th the patient received his first injection of 1 cc. (250,000,000 dead bacilli), in the subscapular region, without any reaction; opsonic index before injection, 0.6. May 30th, index 0.6+, and a second injection of 1 cc. was made, with a decided reaction following. Temperature 99.4° F., pulse 106, respiration 24,—with profuse perspiration, dizziness, insomnia, general nervousness, and pains and stiffness lasting through the night, the patient remaining in bed the next day of his own volition. The injections were repeated June 8th, 9th, and 27th. On July 4th the index was 0.9+. Within this recorded time the patient gradually felt better in a general way, had improved nasal breathing, and a decided shrinking of the nasal mass and that of the larynx. A view of the cords was now possible, the voice became stronger, and the breathing easy with a finger over the tracheotomy tube. On July 5th the tube was removed permanently. About this time the Frisch bacillus could not be cultured from the nose after repeated trials. It being necessary, however, to get a culture to replenish the old supply of vaccine, on July 14th the tonsils were removed with a cold snare, and a culture was obtained from the blood exuding from this fresh surface. The opsonic indices were now omitted, but the injections were kept up, increasing the dose now and then to 4 cc. (1,000,000,000 dead bacilli). With each injection a reaction was noticeable, but not so marked as in the beginning. During August the patient showed further improvement in the local condition. On September 14 another index was taken and found to be up to 1.12. October 2nd the patient was discharged from the hospital at his own request. After leaving the hospital his visits to the clinic became irregular, once a week, rarely twice, but on each occasion he received a vaccine injection. After the 19th of November the X-ray treatment

was added as a weekly seance, but up to date this has not shown as flattering a result as it was reasonable to expect; on the contrary, a slight recurrence was noted in February of this year in the right nostril, which was ablated. The patient as presented tonight shows a great deal of regression of the infiltration, no dyspnoea, and he is able to earn his livelihood. He has had in all forty-three injections, no abscess formation, and no untoward effects other than the reactionary disturbances.

The vaccine was prepared from cultures of the Frisch bacillus grown in tubes on slant agar-agar for twenty-four hours, cultures flooded off with normal salt solution, standardized as to the number of bacilli per cc., and diluted with normal saline. The cultures were killed by exposure to a temperature of 65° C. for one hour, and with the addition of five percent lysol as a preservative the vaccine was ready for use. The vaccine in these two cases was standardized to 250,000,000 bacteria per cc. An autogenous one, being the most potent, was used in each case.

Case II. Helen B., married, aged twenty-five years, native of Soedeltz, Russian Poland, in the United States one year, came to the clinic July 9, 1908. Physical condition, frail, anemic, cachectic. Some nodular deformity of the nose, with the nostrils anteriorly almost closed, and a raised, moist infiltration on the upper lip extending about half an inch downward from the right nasal wing. Abdomen and chest negative. Hands cold. Family history negative. She lived in her country town for sixteen years, was married at seventeen, and has had five full-term pregnancies—two children living and well. Eight years ago had diphtheria for two weeks, and two years after this, in Warsaw, polypoid growths were snared from both nostrils on account of difficult breathing. One year later the nose again became clogged, and another operation was performed, but the clogging soon returned. Thereafter the nasal breathing became more difficult and two years after the nasal trouble began the cutaneous lesion appeared. The nose at times is painful and often bleeds, but the olfactory sense has been preserved.

Local examination showed nodular deformity of the right side of the nose; the right nostril has a pin opening surrounded by a pale infiltrated mass, with an infiltration extending half an inch downward on the lip. The left nostril has a slit opening one-eighth inch long, the rest being filled with the infiltrated mass. The tonsils and pillar are grown into a compact mass extending back to

the pharyngeal wall and coming together to within about three-fourths of an inch. The naso-pharynx is almost entirely obliterated, making it impossible to examine the post-nasal fossa; the uvula is absent, and the soft palate is raised upward and backward; a granulated nodular mass covers the hard palate, extending forward to a line drawn across the second molar teeth. The larynx is free. The right ear has an otitis media purulenta chronica of some years' standing, with little discharge, but painful at times.

The patient was admitted to the ward and during the next month the attempt was made to improve her general condition by good nourishment, rest and tonics. On August 3rd she received (index 0.5+) an injection of 1 cc. (250,000,000 dead bacteria), with practically no general reaction, but a marked local reaction. On August 13th received a second injection of the same amount, and on the 20th (index 0.67) a third injection. This time the general reaction was more marked, and the patient was quite prostrated. On August 31st the general condition was better but the local condition unimproved. Index 0.75, and an injection of 1 1-2 cc. (375,000,000 dead bacteria) was made. September 14th, an injection of 2 cc. (500,000,000 dead bacteria) was given and the patient went home. Had intense dizziness and headache the next day. Did not report September 22nd. From thence on she appeared at the clinic regularly two or three times a week, and received in all thirty-two injections, with no abscess formation. As in the former case, the indices were now omitted, and the injections made about once a week, now and then the doses being increased to 4 cc. Though it cannot be said that the disease has in any way decreased, yet it has not advanced and her general condition is greatly improved. In this case, also, the X-ray has been used two or three times weekly in the usual manner, without any appreciable benefit to date. Excepting for her general improvement, her condition is about as when first seen at the clinic.

CONCLUSIONS.

1. Scleroma is an infectious disease, whose onset has occurred even in infancy, but usually begins in adolescence, and does not show itself only in adult life, as some still believe.

2. The so-called Frisch bacillus plays an important role in the causation of scleroma, being found in the exudate and in the tissue proper, and the author's work, proving that a vaccine prepared from the Frisch bacillus can create at least a local immunity, is a

further point favorable for the etiogenesis of the Frisch bacillus in this disease.

3. The Frisch bacillus has a lively and lasting motility when examined in the hanging drop, and it grows smaller and thinner as the age of the culture increases, as observed by the writer. From the agglutination test, also applied here for the first time with the Frisch bacillus, no conclusion can be drawn. Further tests on patients whose immunity has not been influenced by inoculations might prove valuable.

5. In the biological experiments, the time factor has been overlooked, and in the future, in so chronic an affection as scleroma, a long time for observation must be allowed.

6. The writer believes that a parasite or insect may be the means of transmission for this disease, and when discovered will supply the missing link for the infectious etiology of scleroma.

7. Even allowing its contagion to be mild, at some time the immigration or health authorities in the United States may have to adopt some means to limit the increase in the scleroma cases.

8. The examination of a small piece of tissue leads to fallacy in histo-pathological diagnosis; therefore examine as large a piece as possible.

9. A deformed contour of the external nose is only found in a small percentage of cases.

10. Metastasis does rarely occur in scleroma.

11. The diagnosis of scleroma, at least in the early stages, is not easily made, and the clinical course must be taken into consideration along with the bacteriology and histo-pathology in order to arrive at a correct diagnosis.

12. Scleroma does not render a patient immune to other infections; but other infections may favorably antagonize the scleromal process.

13. At this time the X-ray treatment holds out the best prospects of a positive cure for scleroma. The vaccine treatment has at least caused a local immunity, and may be a means of possible cure if used for a long time and, as to frequency and quantity, in proper dosage. With no criteria to guide the author's original work in this disease, these points in the vaccine treatment still need to be worked out. Surgery has only an elective place in the treatment of scleroma, and is useful only as an auxiliary.

The paper concludes with a very full bibliography.

No. 1333 Madison Avenue.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, April 13, 1909.

HENRY GRADLE, M. D., Chairman.

PRESENTATION OF PATIENTS.

DR. J. C. BECK presented a man who had been severely mutilated in the Kishineff massacre six years ago. The ears presented the worst deformity, and Dr. Beck proposed to perform a cosmetic operation, showing the patient at this time merely for purposes of comparison.

Acute Attic Suppuration with Hernia of the Drumhead, leading to Trancient Labyrinthitis. By H. GRADLE, M. D.

(To be published in full in a subsequent issue of THE LARYNGOSCOPE.)

Following an attack of so-called grippe, the man had intermittent rather severe earache for about four weeks, with a discharge, mucopurulent, but scant from the beginning. It was the history of an acute attack of inflammation of the attic produced by the staphylococcus. The meatus contained a reddish glistening tumor, completely covering the drumhead. On incision it proved to be a bag with very thick walls, through which the air could escape from the middle ear. Under gauze drainage it shrank and finally disappeared completely. As it receded, it could be distinctly recognized as a protrusion of Shrapnell's membrane enormously thickened. Ultimately the drumhead became entirely normal. The apparently solid tumor of the size of a large pea did not remind one of the more delicate, smaller and pedunculated pouches of the drumhead described mainly by Politzer in myringitis and in inflammation of the attic. According to the author's experience, the condition was unique.

The patient's steady progress was interrupted on the eighth day of treatment by some general malaise, though without fever. The pain, which had left him entirely, returned slightly. The tympanic pouch appeared more swollen. There was no change in the discharge, except the gradual diminution. The bag was again incised, with some local relief. One night later, however, he awoke with intense dizziness, nausea and vomiting. The only way of relief was absolute immobility of his back. Besides the symptoms referring to the semicircular canals, it was found that his hearing, which had been fair, was considerably diminished. At

no time was there spontaneous nystagmus or subjective noises. There was no change in the objective condition of the ear. The labyrinthine symptoms disappeared completely within a little over a week. Within a month from the beginning of treatment, the ear had become perfectly normal, with intact hearing.

Dr. George E. Shambaugh had seen the patient and said that one of the interesting features was the protrusion of Shrapnell's membrane. The confinement of the suppuration in the attic is readily accounted for by the fan-shaped arrangement of the ligaments about the neck of the malleus. An examination of these ligaments with the reduplication of mucous membrane extending from the ligaments and the ossicles to the surrounding walls sometimes shows the attic or recessus epitympanicus, shut off from the tympanic cavity proper, with the exception of a small opening, which, in the case of inflammation, could be readily swollen shut.

The labyrinthine involvement in this case is of special interest. The condition was evidently not an extension of suppuration into the chambers of the inner ear, such as sometimes occurs in suppurative otitis media. An involvement of the inner ear other than by an invasion of pus is not so uncommon in acute suppurative otitis media. In these cases the trouble is usually limited to the cochlea, and is manifested by a more or less extensive defect for the higher notes of the Galton whistle. In many of these cases this defect in hearing disappears completely, while in others it remains permanent. Since cases of this kind rarely come to autopsy, it will be difficult to determine positively what the pathological changes are in the labyrinth. Several possible conditions suggest themselves. One is that there is a serous exudate into the structures of the inner ear, not necessarily an increase, as is sometimes supposed, of the fluids in the labyrinthine chambers. Another is that a hyperemia is occasioned, involving the lower end of the basal coil, thus producing a defect for the highest tones. It would also seem probable that an inflammatory round-celled infiltration could occur in the structure of the cochlea, producing the disturbance in function.

Dr. Harry Kahn cited the case of a woman, 56 years old, who, three weeks after an attack of influenza, developed an otitis media on the left side. A paracentesis was done, and on the next day there developed a slight oedema of the mastoid tip. This became worse, so that a second paracentesis had to be done. On the fourth day she developed labyrinthine symptoms, extreme nausea and vomiting, with dizziness, and had nystagmus that was very

prominent at first toward the affected ear for about twelve hours, with a sensation as of falling forward. After about twenty-four hours the nystagmus came on when she looked toward the opposite side, with dizziness and vomiting, but becoming gradually less as she lay on the right side. These symptoms lasted four days, and then disappeared. It is now three weeks since these symptoms developed, but whenever she makes the least movement, there is dizziness and nystagmus. During the presence of the initial symptoms, hearing was reduced; there was a short positive Rinné; the Edelmann-Galton whistle was reduced to 5½. This continued for two weeks, when she gradually became better, and now she hears well. Dr. Pierce, who saw this case, thought that these cases developed usually in older people, and that there was some connection between the development of the labyrinthine symptoms and middle life or old age when arteriosclerosis or some other change sets in.

Dr. J. Holinger said that about a year ago he had presented before the Society a girl of eighteen who had all the symptoms described by Dr. Gradle, namely, deafness, nausea, dizziness, etc.; in one word, she had a labyrinthitis in connection with an acute otitis media: a panotitis. Of course, she had no arteriosclerosis, so that the labyrinthine complication probably has nothing to do with age nor with arteriosclerosis, but is very likely due to a defect in the wall of the labyrinth. In the case of Dr. Gradle, why should one not consider the possibility of a closed-up Prussak's space? Dr. Holinger did not believe that it would be too far-fetched to think that the fluid which gathered there in connection with an acute otitis might exert pressure against the body of the anvil, which, transmitted through its long process to the stirrup, might produce labyrinth symptoms. A second possibility is that of an acute serous labyrinthitis.

Dr. A. H. Andrews has seen two cases of circumscribed bulging of the membrana tympani, one being in the membrana tensa and the other in Shrapnell's membrane. They were caused by acute otitis media with serous effusion. Neither perforated, and after using phenol-glycerine for its osmotic effects, resolution occurred. After the fluid in the middle ear disappeared, the bulging portion of the membrana tensa remained flaccid, so that by varying the air pressure with Seigel's otoscope this portion of the membrane could be made to move inward and outward from the general line of the membrane. The ear was examined on several successive days, and the membrane was seen to gradually regain its normal tone.

He does not remember the hearing records as the patients were seen several years ago. He thinks there is no question but that pressure in the middle ear may cause circumscribed bulging of the membrane, and that this may account for Dr. Gradle's case, but it could not account for the extreme thickness of the sac wall.

PHYSIOLOGY OF THE COCHLEA.

PROFESSOR A. J. CARLSON said that doubtless many invertebrates have sound perception, although not possessed of a structure strictly comparable to the ear of vertebrates. Insects have auditory hairs and membranes. The evolution in the ear of vertebrates occurs only in the cochlea, not in the semicircular canals, sacculus or utriculus. Fishes, however, hear without a cochlea, but from the fishes upward the cochlea is present, and it shows practically the same structure throughout. The elements lacking in some groups are not essential for sound perception. The rods of Corti are lacking in some animals, the number of hair cells is variable and the tectorial membrane appears to vary in structure. The greatest striking difference is in the length of the cochlea, not in histologic details. It is shortest in frogs, while in the human species it reaches its highest development. The cochlea is the organ for sound perception, although the sacculus and utriculus cannot be excluded. The theories developed to explain the mechanism of the cochlea fall into two groups, those of central and those of peripheral analysis. Peripheral theories depend on resonance and "sound patterns," etc. The Hunt theory is the compression theory, and waves meeting at different points in the cochlea, according to the length of the sound waves. Meyer's theory takes into consideration the distance the perilymph waves travel in the cochlea. Ewald claims that the pitch is determined by the sound patterns produced by the hair cells coming in contact with the tectorial membrane. The resonance theory of Helmholtz is worked out in greatest detail and quite generally adopted. The telephone theory of Rutherford appears to be incompatible with what is known of the physiology of conduction of nervous tissues.

PRESENTATION OF PAPERS.

DR. J. G. WILSON read a paper on "The Telephone Theory."

DR. GEORGE E. SHAMBAUGH read a paper entitled "Why a Peripheral Tone Analysis is necessary to Explain the Phenomena of Tone Perception."

(*Both to be published in full in subsequent issues of* THE LARYNGOSCOPE).

DR. A. H. ANDREWS (in discussion) referred to the question of whether fishes hear, and called attention to the fact that two stones struck together in the water produce an exceedingly unpleasant sensation in the ears of one who is under water. It has been shown that fishes can be driven toward a net by this method. It would seem, therefore, that fishes must be susceptible to the same sound impressions as affect the ears of individuals under water. Dr. Shambaugh spoke of subjective noises being produced by a long continued shrill whistle, and that they were always of the same pitch as the whistle producing them. Dr. Andrews does not know how these subjective noises are produced any more than he understands the physiologic process of thought. It is known that one can think so long and so intently upon a given subject that he cannot think of anything else. This may have some relation to the tinnitus which is caused by the long continued intense sound mentioned by Dr. Shambaugh.

DR. J. HOLINGER said that his views as to sound perception were pretty well known. The presentation by Dr. Wilson of his telephone theory was new to him. He would ask Dr. Wilson how he explains the following finding: A man stands beside a locomotive while its steam whistle emits a loud shriek. The man remains deaf for the rest of his life for any tone of the pitch of that whistle, but suffers from an uninterrupted subjective noise of that pitch. At death, degeneration of certain parts of the cochlea is found, and ascending degeneration of certain parts of the acoustic nerve. Further similarly conclusive arguments are gathered now at the laboratory from animals. If, as Dr. Wilson explains, with each sound the whole of the basilar membrane vibrates, why should a circumscribed degeneration of the nervous part affect the hearing or perception of one certain set of tones and not others? Furthermore, the problems of the middle ear are not likely to support Dr. Wilson's standpoint.

DR. CARLSON called attention to the fact that no matter what theory is adopted, that of central or peripheral analysis, it must not be forgotten that the ultimate analysis in both is central, but in order to have central differentiation there must be differentiation in the impulses that go to the center, because, if these were identical, there could not be any central differentiation. A tuning fork vibrating one hundred times will send its nervous impulses along different sets of nerve fibers from those which conduct the vibrations of a tuning fork vibrating two hundred times. Rutherford stated that the two impulses are conducted by the same fibers and

differ only in rate, and that a central differentiation is made on this basis. That is, central analysis or the telephone theory. Ewald's theory is based on peripheral analysis. Rutherford assumes that the highest pitch of the Galton whistle gives, say, 40,000 nervous impulses per second. Comparative physiology of nerve fibers and cells shows that it is highly improbable that they can conduct at that rate. It is possible, but not probable, that the auditory nerve can conduct impulses at the rate of ten or thirty thousand per second, but, as conceived by Rutherford, it cannot conduct impulses corresponding to a number of tones at the same time, as the facts of experience demand. It ought to be possible to connect the auditory nerve with a capillary electrometer and measure the number of impulses generated by different tones. The difficulty in doing experimental work is that one can rarely injure one part of the hearing apparatus without injuring the whole apparatus, and the uncertainty in determining auditory defect in animals. Therefore, the final answer must come from the clinician.

DR WILSON stated that in this discussion the fundamental differences between the resonance theory and the telephone theory did not seem to be clearly recognized, and so discussion of their relative merits lost much of its force. What are the essential points in the telephone theory as enunciated by Ewald or by Waller? Namely, that the basilar membrane vibrates as a whole to the sound waves which there produce distinct peripheral impulses, in turn communicated through the hair cells to the acoustic nerve; further, that the ultimate analysis in the tone perception is central. It will be noted that the telephone theory acknowledges distinct peripheral impulses in the cochlea, but this is a totally different thing from peripheral analysis, due to resonators, demanded by the Helmholtz theory. In regard to tone islands and gaps, no less an authority than Nagel has stated that these are capable of being simply explained by the Ewald hypothesis. The telephone theory does not claim at the present moment to explain everything, but it offers a good working hypothesis along the lines of which progress may be made, and it is not open to those fundamental anatomical and physiological objections which can be urged against any resonance theory.

DR. GEORGE E. SHAMBAUGH (closing discussion) stated that he had listened closely to the remarks by Dr. Wilson purporting to be arguments in support of the telephone theory, and had failed to hear a single scientific argument in support of this hypothesis. He is, therefore, obliged to repeat the statement made at a previous meeting that not only is the telephone theory untenable, but that it

is without supporters among physiologists to-day. The assumption that Ewald is a supporter of the telephone theory is, of course, a mistake, since Ewald's theory is as much a theory of peripheral analysis as is the resonator theory of Helmholtz. Occasionally someone may persuade himself, as Dr. Wilson has done, that he is a supporter of the telephone theory, but as soon as he attempts to give his reasons he at once chases himself up a tree. The chief argument Dr. Wilson has offered to support his view is that he conceives of a telephone theory modified from the original. But when he attempts to point out wherein this modification lies, he begins at once to advocate, as Dr. Carlson has pointed out, the principle of peripheral analysis, just the opposite hypothesis from the telephone theory, the theory of central analysis.

Another good example of the illogical position assumed by certain would-be supporters of the telephone theory, is the case of Professor Hardesty, of the University of California, referred to by Dr. Wilson. About a year after Dr. Shambaugh's first paper on the physiology of the cochlea appeared, Professor Hardesty published a treatise on the same subject, in which he expressed practically the same conclusions which Dr. Shambaugh had reached, namely, that we must look to the mebrana tectoria rather than the basilar membrane as the active agent in bringing about a stimulation of the hair-cells in the organ of Corti by responding to the impulses of sound-waves in the endolymph. In his paper he asserts over and over again that his conclusion as to the probable action of the membrana tectoria in responding to the impulses of the various tones differs from the conclusion Dr. Shambaugh had reached, in that he advocates a modified telephone theory. His modification of the telephone theory, however, is nothing short of a substitution of the principle of peripheral analysis for that of central analysis, which constitutes the fundamental conception of the telephone theory. That Professor Hardesty has accepted in his paper the conclusions Dr. Shambaugh had reached as regards the necessity for peripheral analysis, is brought out very clearly where he discusses the possible cause for the phenomenon of tone islands and defects in the tone scale. These may be produced, he contends, by the occurrence of circumscribed calcareous deposits in the membrana tectoria. Now it is quite clear that if the interference with the motion of a part of the tectorial membrana, such as would be occasioned by a circumscribed chalk deposit, will produce a defect in the tone scale, then the converse is also true, namely, that the vibration of this particular part of the tectorial membrane will result in the perception of the part of the

tone scale included in this defect. This is as concise a statement of the principle of peripheral analysis as one could wish. In the telephone theory every hair cell in the cochlea will be stimulated for every tone. It is clear, Dr. Shambaugh contends, that from whatever point of view the problem is approached, anatomical, physiological or clinical, there is no escape from the conclusion that the principle of peripheral analysis is indispensable in the theory of tone perception.

Otogenic Abscesses in the Cerebellum and Their Operative Treatment. FRED PONTOPPIDAN. *Dissertation*, 1906.

The author has based his dissertation on twenty-one cases. The histories are all reported, originating with Schmiegelow (5 cases), K. Poulsen (2 cases), the General Hospital (11 cases), and Frederik's Hospital (2 cases), while one case was treated by the author with excellent results. By looking over the records of the necropsies performed at the General Hospital from 1895 to 1904, 6,000 in all, he found nineteen cases of cerebral abscess, of which six had their seat in the cerebellum, or about one-third. He also notes in his treatise 157 cases of cerebellar abscess, gathered from the literature. The author undertook a smaller series of investigations of the operating room to learn what parts of the cerebellum the abscess attacks in its eccentric growth. He established an opening in the bone on each side, 1.5 cm. behind the supermeatal spine, on the line of connection between the spine and the occipital protuberance, passed a thread through the perforations directly through the cerebellum, and removed the brain, which was taken out and hardened in formalin. It then appeared that the perforation went through the medulla oblongata at the junction between this and the pons varolii, close beneath the bottom of the fourth ventricle. An abscess lying in the region of the sigmoid fossa in the extreme farthest corner of the cerebellum will then, in its penetration inward, thrust against the uppermost part of the medulla oblongata and perforate into the fourth ventricle, yet in practice the abscess rarely reaches so far as that; he found it so reported in only six cases. He speaks strongly in favor of the transmastoidal method with trephining anterior to the descending portion of the sinus transversus which led to healing in 60 percent, in contrast with which trephining behind the sinus led to healing in only 33 percent of the cases. KIAER.